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FEATURE SECTION

Editor's Note. The following eight articles were invited by the Editor to promote a better understanding of pharmaceutical education as it exists outside the United States. The contribution on pharmaceutical education in France by Professor M.-M Janot of the Faculty of Pharmacy of Paris and the article on undergraduate pharmaceutical education in Germany by Professor Glenn Sonnedecker of the University of Wisconsin were not received in time for publication and will appear in the Spring issue.

PHARMACEUTICAL EDUCATION IN GREAT BRITAIN--A COMPARATIVE STUDY

J. W. FAIRBAIRN*

This article falls roughly into two parts. In the first part I shall discuss the development of pharmaceutical education in Great Britain, and later I shall give an account of the present courses in pharmacy. In this latter section I do not propose to go into great detail on the requirements for each individual subject of the academic course as this would require a number of separate articles by specialists in each subject. In both sections I shall compare the situation here with what I know of the situation in the United States.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN

One of the most striking differences between pharmacy in the United States and in Great Britain is the fact that in the latter very few practicing pharmacists possess a university degree. This situation is changing, but even now no more than 15 per cent of pharmacists possess a degree in pharmacy; the remainder practice by virtue of a diploma granted by the Pharmaceutical Society. To understand pharmaceutical education in Great Britain it is necessary at once to recognize the dominance of the Pharmaceutical Society in this area.

Pharmaceutical education, as we know it, might well have started in England with the granting of a Royal Charter by King James I to the Society of Apothecaries in 1617. Unfortunately, the apothecaries insisted on carrying out certain functions normally restricted to medical men and were ultimately absorbed into the medical profession, and to this day it is still possible to practice medicine by virtue of a license from the Society of Apothecaries. The Pharmaceutical Society was founded in 1841 to look after the interests of the true pharmacists or "chemists and druggists" as distinct from the apothecaries. In spite of this rather belated start in comparison with their

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European brethren, and with considerable foresight, the founders of the Society at once addressed themselves to the task of pharmaceutical education; their aims in the words of their Royal Charter being "Advancing Chemistry and Pharmacy and promoting a uniform system of education of those who practice the same and also for the protection of those who carry on the business of Chemist and Druggist." In furtherance of these aims they immediately started a school of pharmacy which is now part of the University of London. Originally they envisaged a society of registered pharmaceutical chemists and registered assistants, but by 1869 the Assistants' Examination (Chemist and Druggist Diploma) became the basic one for membership while the Pharmaceutical Chemist Examination became a sort of extra qualification which carried with it higher status. Those with the Pharmaceutical Chemist Diploma (Ph.C.) tended to enter the manufacturing, teaching, or hospital branches of pharmacy whereas those with the Chemist and Druggist Diploma remained in retail practice. This two-class system of pharmaceutical education persisted for almost 100 years, and, although the Pharmaceutical Society in 1954 abolished the old chemist and druggist course, the idea of an ordinary and a more advanced pharmacist still persists. This fact will be referred to later.

By virtue of these historical developments and for other reasons the Pharmaceutical Society here holds a much stronger position than any single pharmaceutical organization in the United States. It fulfills the aims of the American Pharmaceutical Association with this important difference: every practicing pharmacist in Great Britain must be a member of the Pharmaceutical Society (M.P.S. is quite a respected "qualification" in the eyes of the public). All members must pay dues of about eleven dollars per annum, and all retail stores must also pay annual dues of nine dollars. The Society is therefore assured of a steady and adequate income to carry out its duties, one of which is the responsibility to see that the requirements of the Pharmacy Acts are met. The Society is also responsible to the Privy Council, in the last resort, for all pharmaceutical education and regularly inspects all teaching institutions training candidates for its diploma; it also sets and marks the necessary examination papers. Furthermore, all university degrees in pharmacy must be approved by the Society before graduates can be registered. It thus carries on some of the functions of your National Association of Boards of Pharmacy and of the American Association of Colleges of Pharmacy. Since about 80 per cent of the membership are retail pharmacists, the elected representatives on the Council of the Society are predominantly retail pharmacists so that the interests of this section of pharmacy are also well served.

THE UNIVERSITIES AND PHARMACEUTICAL EDUCATION

I have already pointed out one reason why few pharmacists hold a university degree; the Pharmaceutical Society has carried out its original aims with commendable efficiency. Another reason, however, is the university tradition in this country. Unlike the situation in America, the power of granting degrees in the United Kingdom is severely restricted. For many centuries only Oxford and Cambridge enjoyed this privilege. But in the last 100 years several more universities have been founded, and there are

now twenty-one in this country. There is still a strong feeling in certain academic circles that, before newcomers are allowed to join this privileged circle of universities, not only must high standards be expected but the types of subjects taught should be carefully scrutinized. Though the following statement of Sir C. Grant Robertson in his book *The British Universities* is now twenty years old, it still represents an important viewpoint. "The training of a theologian, a philosopher, a lawyer differs from the training of a mechanic, a grocer or an apothecary, (*sic*) as essentially as does the training of a surgeon from that of a nurse." Subjects which are not sufficiently "pure" for inclusion in a university should be taught in a technical college, and in this country most towns have technical colleges in which instruction connected with various trades, commerce, and some professions is given. In the last forty years the majority of pharmacists have received training for the diplomas of the Pharmaceutical Society in these technical colleges. I should point out that this attitude of the "purists" towards technological subjects is vigorously opposed by many educators, who rightly point out that the status of the technical colleges is thereby reduced and that partly as a consequence, Great Britain is lagging behind in the production of technologists and technicians. As often happens, a compromise has been effected, and recently many technical colleges have been elevated to a new status as "colleges of advanced technology," with courses—and it is hoped ultimately with staff and status—equal to those of the universities. Whether this compromise will succeed or whether ultimately all the colleges of advanced technology will become universities remains to be seen. If the latter development occurs, then it is obvious that, in this respect, the American universities are ten to twenty years ahead of the British.

With this background in mind, it will be readily understood that when about thirty years ago attempts were made to establish university degrees in pharmacy, the courses proposed were based on the higher qualification (Ph.C.) of the Pharmaceutical Society. Moreover, the university emphasis on the training of the mind rather than mechanical memorizing of facts and the discussion of basic principles rather than the learning of particular skills has tended to make the university course more academic or "pure" (if such a term can ever be used of pharmacy) than the diploma course. Furthermore, most universities require the student to remain longer at college than is required for the diploma course. The net result is a widespread feeling that the degree pharmacist is more suitable for industrial, hospital, and teaching pharmacy, whereas the diploma pharmacist is more likely to enter retail practice. Thus the old two-class system already referred to has reappeared in the form of degree and diploma pharmacists.

CURRENT UNIVERSITY COURSES IN PHARMACY

It is important at the outset to emphasize a few points of distinction between American and British university courses. In most universities here the boy or girl enters at the age of eighteen or more with a knowledge of the basic subjects (e.g., chemistry, physics, etc.) equal to that reached only after one year or more in an American university. Hence at the end of a three year course here a student should be at least as advanced academically as one after a four year course in the United States. Furthermore,

in this country there is no such thing as "working one's way through college" as the cost of maintenance, fees, etc. is met from public funds or, where this is not so, the student must find enough money to maintain him without a part-time job. Didactic teaching is therefore based on the assumption that the student is a truly full-time one and that not only are his evenings free for study but part of his total vacation time (at least twenty weeks per year) should also be available. In these circumstances of real full-time study the teaching can be more concentrated, and, in my opinion, over a normal pharmaceutical course a saving of about one year is made over a similar, though more attenuated, course in the United States. It is important therefore to realize that a three year course in pharmacy in a British university is equivalent to a four to five year course in the United States. It is interesting, however, to note that some British universities are having to add a further year to their normal courses in order to teach the basic sciences because the high schools are opposed to specialization by pupils under eighteen years old. This trend may well continue so that once more we shall be following the practice already existing in the United States. However, I do not think that the system of "working one's way through college" will ever be adopted here.

Another point of difference relates to the method of evaluating the student's performance. In America the grade system based on numerous tests set at the end of short courses seems to be widely used. In the United Kingdom we use the "final examination" system. At the end of a period of one or two years an examination consisting of written and practical papers is set; this examination covers all the work done in all the subjects during the previous year or two, and the performance of the student in this examination is taken as the true estimation of his ability. In practice, some of the examiners are usually also the teachers, and so the student's day-to-day performance can be taken into account, especially where the results are borderline between grades or between pass and fail. A third difference between the two teaching systems is that the type of question set in this final examination is quite different from those I have seen in American examination papers. We emphasize the importance of the student being able to discuss his facts, marshal them in logical order, and to write short essays, etc. on selected topics.

I have worked in both systems, and I think that the British one possesses distinct advantages. Because of the continuity of the courses over a year or two the student is expected to take a more sustained interest in the topics studied and thereby to obtain a more profound knowledge of them. Furthermore, the type of question set forces him not only to learn the facts but to learn them accurately and really to understand the underlying principles. As Bacon put it "Reading maketh a full man, conference a ready man and writing an *exact* man." As teachers, we all know how thorough a knowledge of the facts and ideas is necessary before we can write a lecture, and, while our examination papers require much less than this of the student, I think it is a trend in the right direction.

Higher Degrees. Graduates in pharmacy can proceed to a master's degree or to a Ph.D. degree. No course work is required for the Ph.D. degree nor is it necessary to take a master's degree first. The graduate immediately

starts on his research problem and usually completes the work for a Ph.D. in two or three years of full-time study. The D.Sc. degree is of much higher standard and is only awarded for independent research of high quality based on several years post-Ph.D. research work.

The Pharmacy Course at the University of London. This course can be studied either at the School of Pharmacy, University of London, or at the Chelsea Polytechnic, London. During the first two years the student studies *pharmaceutics,* including microbiology and forensic pharmacy (three lectures and eight hours laboratory per week); *pharmaceutical chemistry* (three lectures and eight hours laboratory); *pharmacognosy* (two lectures and three hours laboratory); and *pharmacology* (two lectures and three hours laboratory). He then enters for his Part I Examination and, if successful, is allowed to proceed to the third year course leading to the Part II Examination. For this third year course he chooses two of the following five electives: pharmaceutics, pharmaceutical chemistry, pharmacognosy, pharmacology, and pharmaceutical engineering science. The latter is a new subject, though it naturally flows out of pharmaceutics. The aim of this course is to impart the basic chemical engineering principles involved in manufacturing pharmacy. The student devotes three lectures and ten hours laboratory per week to each of the two subjects he has chosen; he is also expected to do a fair amount of library work and, in most of the subjects, to prepare a short thesis or dissertation on a selected topic. The successful candidates at the Part II Examination are graded into First Class Honors, Second Class Honors, or Pass *B.Pharm.* as is done with most other university degrees.

The University of London also has a curious system of *external degrees;* that is, students can study in certain approved technical colleges in the provinces and then enter for a special degree examination set by and marked by members of the appropriate faculty of the University. Thus, about five to six technical colleges in England are approved to prepare students for the Extenal B.Pharm. degree. There are obvious disadvantages in having students taught in one institution (the technical college) and being examined by the faculty of another (the University of London), but it does give provincial students who live in a district without suitable university courses the opportunity to study for a university degree. The technical colleges which train students for the External B.Pharm degree also run courses for the Diploma of the Pharmaceutical Society (see later), and in spite of the disadvantages mentioned above, the proportion of students entering for the External B.Pharm. is increasing.

The Pharmacy Courses at Other Universities. Five other universities have pharmacy courses. At Manchester (B.Sc.) and at Cardiff (B.Pharm.) the course lasts four years, and more time is devoted to the pure sciences allied to pharmacy. In the final year at Manchester only one elective is studied. At Nottingham (B.Pharm.) the course is similar to that in London except that in his third year the student may continue studying all four subjects of Part I or elect two for more profound study. At Leeds (B.Sc.) more emphasis is laid on pharmacology, and at Glascow (B.Sc.) all students take pharmaceutics as a major subject in their third year with the choice of one of the following five electives as a subsidiary subject: biochemistry, microbiology, pharmaceutical chemistry, pharmacognosy, or pharmacology.

CURRENT COURSE LEADING TO THE DIPLOMA OF THE PHARMACEUTICAL SOCIETY

While one or two of the universities already mentioned run courses for the Diploma, the majority of students in this category study in one of twelve technical colleges including the Chelsea Polytechnic, London.

At the moment the course lasts two years, and the same four subjects of the Part I B.Pharm. are studied; however, a higher proportion of the time is devoted to pharmaceutics and pharmacology at the expense of pharmaceutical chemistry and pharmacognosy. It has just been announced (*Pharm. J.* 1957, *179*, 179) that after 1958 the course will be extended to three years and will include, in the third year, a course on business management. Apparently there will be no great increase in the total amount of work involved as it is intended that the student should have more time to absorb the knowledge more thoroughly. Thus, though the diploma course will be equal in length to the degree course, it seems that there will still be a considerable gap between them, both in the content of the course and the distribution of the subjects.

APPRENTICESHIP

All successful students, whether degree or diploma, must serve one year's apprenticeship in an approved retail store, hospital, or certain industrial firms before being registered. The degree students are also required to pass an examination in forensic pharmacy, set by the Pharmaceutical Society, but otherwise no other examination is necessary for registration.

RECIPROCITY

Reciprocity agreements between the United Kingdom and the following countries of the Commonwealth exist: Australia (each of the states), Canada (Province of Ontario only), New Zealand, Northern Ireland, South Africa. In the British Colonies, such as East Africa and the West Indies, the pharmaceutical qualification of the United Kingdom is legally recognized.

SUMMARY AND DISCUSSION

To sum up: the present situation in Great Britain is that all practicing pharmacists, except a few in certain industrial and teaching posts, must be members of the Pharmaceutical Society and must pay annual dues to retain this membership. The majority become members by virtue of a Diploma of the Pharmaceutical Society, awarded after attending a course in one of twelve approved colleges and passing a common examination set by the Society. Others become members by virtue of a degree granted by one of six universities (one or two of which also run parallel courses for the diploma). On the whole the diploma pharmacists enter retail practice, and the degree pharmacists enter industry, hospital pharmacy, or teaching.

The question that naturally arises is this: Is this two-class system unnecessary or does it represent a fundamental factor in British pharmacy? It has persisted throughout the whole history of official pharmacy in this country and though the Pharmaceutical Society has abolished the system, as far as its diplomas are concerned, and now announce further changes, which, in theory, should bring its diploma into parity with the degree, there is still a widespread feeling that the gap between the degree and diploma

courses will widen rather than be bridged. It might well be that this gap represents a real tension between retail pharmacists and the teachers, to put it in a simple and rather crude form; and it is interesting to compare the situation here with that in the United States. In both countries I note this same tension between retail pharmacists, who would like to see college requirements lessened, and the teachers, who press for increasing college requirements. Since the universities exercise a powerful influence over pharmaceutical education in the United States, it is obvious that the teachers' point of view has a good chance of prevailing. And, in fact, your college requirements have been increased recently! In the United Kingdom, however, the retail pharmacist is well represented on the Council of the Pharmaceutical Society and can therefore still exert a powerful effect on the course of pharmaceutical education. The vacillations shown by the Society during the last decade over the question of pharmaceutical education reflect the obvious tensions that exist. On the one hand it is accused by many members of being too academic, of making its educational requirements too high. On the other hand its commendable history in the area of pharmaceutical education rises up from the past like a signpost pointing out that the only way to maintain and improve professional status in an increasingly scientific society is by continually increasing academic standards. In what is probably a typically British response to this situation, the Socety seems to have effected a compromise; it is extending the length of the diploma course but is not increasing the academic content in proportion. Will this compromise succeed and ultimately will the status of the diploma and degree pharmacist become equal or will the gap widen? My own guess is that the gap will widen, and that, furthermore, an increasing proportion of young people from the schools will enter for university degree courses. I understand that at the moment there are about 4,000 pharmacy students in the "pipeline," and of these between 30 to 40 per cent are aiming at a degree in pharmacy. Obviously, if such a trend continues, and more and more pharmacists qualify via the degree, the two-class system will gradually disappear.

What then would be the effect of degree students entering retail pharmacy in significant numbers? Many pharmacists consider this would be putting the proverbial square peg into a round hole; the B.Pharm. is just too academic for the general retail store. Others maintain equally stoutly that, in the long run, such a trend will raise the status, and economic well being, of retail pharmacy. I think that your experience in the United States may well be some guide in this matter. The development of your fine prescription pharmacies on the West Coast was directly attributed by your academic people (who are not wholly unbiased observers!) to the fact that the retail pharmacists are now highly trained men. This is the view that some of us here in the universities would like to support, but meanwhile we are so busy training students to meet the growing demands of industry, hospital pharmacy, and teaching, that the problem of training for retail practice seems somewhat remote. During the last half century pharmaceutical operations have gradually moved back from the dispensing counter to the manufacturers' bench, and we have tended to follow this scientific vanguard. However, events in the next few decades may well demand that we move back again in order to re-occupy the whole pharmaceutical territory. If so, you will be

able to repeat what I have said more than once, that, in yet another respect, American pharmaceutical education is a decade or two ahead of the British. But as one who has had some experience in both countries I still maintain that this lead applies only "in certain respects"!

The medical profession seems to have reached that stage in its growth, where it assumes that it is the only profession that has idealism and that it holds a commission directly from God, not only to set the standards for its own conduct, but for the conduct of all other professions. Any profession that assumes that attitude is in the same position that a national dictator is . . . . But in the case of dictators of an earlier generation it should be remembered that such conduct led Dictator Napoleon to a weary life on a barren isle, and it led Dictator Wilhelm to a woodpile.

Rufus A. Lyman, Am. J. Pharm. Ed., 2, 272 (1938)

PHARMACEUTICAL EDUCATION IN NORWAY

EINAR BROCHMANN-HANSSEN*

Pharmaceutical education must be adapted to the practice of pharmacy in the country where it is offered. It is, therefore, desirable to know some of the more important features of Norwegian pharmacy in order to understand the needs and the problems of pharmaceutical education in Norway.

All pharmacies in Norway are strictly professional ("Apotek"). They are under the Director General of Health Services whose office is attached to the Department of Social Affairs. The establishment, organization, and operation of a pharmacy are controlled by numerous governmental regulations, and to "own" a pharmacy in Norway has for centuries been a privilege granted by the government largely on the basis of seniority. However, certain outstanding qualifications are also considered in awarding the concessions. The number of pharmacy concessions are limited according to population. Whereas we in the United States on the average find a pharmaceutical outlet for each 3,000 people, there is in Norway only one pharmacy for every 12,000-13,000 people. Because there are so few pharmacies, most pharmacists will be between fifty and sixty years of age and soon facing retirement before they will have their own pharmacy. A retirement plan becomes effective when they reach the age of seventy.

Norwegian pharmacies are more professionally departmentalized than is customary in the United States. In addition to being outlets for dispensing medication to the the public, they also engage in production and manufacturing. All official preparations (tablets, capsules, extracts, tinctures, ointments, etc.) are manufactured in the pharmacies. They also compete to a great extent with the pharmaceutical industry for production of nonofficial preparations. Because of this activity, the pharmacies must have the facilities for, and be able to carry out, analytical control work.

The educational attainment of a student when he enters his studies at the university is an important factor in organizing a curriculum. One of the major concerns of pharmacy educators in the United States has been the inadequacy of our high schools as a starting point for a professional education in pharmacy. It, therefore, seems desirable to give a brief survey of the educational system in Norway at the secondary level before going into a detailed description of the pharmacy curriculum.

While our system of secondary education is based on the philosophy of mass education, secondary schooling is not compulsory in most European countries, but is rather considered a preparation for a higher education. This important difference in the intent of secondary education must necessarily affect the selection of, as well as the emphasis on, the various subjects.

Norwegian children start school at the age of seven, and their primary education lasts for seven years. Secondary education adds an additional five years, leading to the "Artium" degree, which is the degree necessary for admission to the universities and colleges of Norway. Since the primary

*The author spent the academic year 1956-57 at the Pharmaceutical Institute of Oslo University, Norway, working on a research project financed through a grant from the Norwegian Research Council for Science and Humanities.

and secondary education covers only twelve years, it might seem logical to equate the Artium degree with an American high school diploma. Such an evaluation would, however, be quite misleading, as pointed out by Dr. E. Haugen (1) of the University of Wisconsin.

Dr. Haugen made a thorough study of the educational system of Norway while he served there as Cultural Relations Attaché for the U.S. State Department. He says:

> (1) Norwegian children start a year later than American children, a year during which little is taught that the home cannot supply (it is noteworthy that such skill subjects as reading, writing and arithmetic are introduced earlier and taught more intensely than in most of our public schools); (2) while our high school students carry four or five subjects for a total of 20-25 hours, spending a maximum of 30 hours in school with little home work, the Norwegian students spend 36 hours a week in school for a total of 40 weeks, with constant home work amounting to from 2.5 to 3 hours daily (in the last three years before Artium a Norwegian student goes to school 4,320 hrs. compared to an American student 3,240 hrs.; the difference of 1,080 hrs. equals 36 American school weeks or a whole year's study); (3) the emphasis on university preparation and the rigid curriculum mean a greater maturity of purpose and a more rapid acquisition of such tool subjects as languages and mathematics (a relatively smaller proportion of the population attends the secondary school, with correspondingly greater selectivity and singleness of purpose); textbooks are shorter and less wordy, and must be conned more intensively. In view of these facts it would not seem unreasonable if Norwegian students with Artium should be considered Juniors, i.e., (college) students whose general education is completed and whose special education is about to begin.

Many institutions of higher learning—including the School of Pharmacy—impose restrictions on admission due to limitations of space and as a means of regulating the number of graduates to meet the needs of the various professions. Since admission is based on the Artium records of the applicants, the Artium has almost ceased to be purely a qualifying degree, but has become a competitive degree. The school leading to the Artium degree is called "gymnasium."

After the second year of his secondary education, the student has the opportunity to specialize with a choice of five sequences or courses: the Science Sequence, the English Sequence, the Latin Sequence, the Biology Sequence, and the Norse Sequence.

The two first sequences are the most important and attract the largest number of students. Table I lists the number of hours per week devoted to each subject taught in the Science Sequence. The English Sequence has more English, German, and French, but less mathematics and physics. The Biology Sequence has more chemistry and biology, less French, and somewhat less mathematics.

THE PHARMACEUTICAL CURRICULUM

Pharmaceutical education in Norway—as in this country—has gone through several stages of development. Prior to 1931, the student who wanted to embark on a career in pharmacy had to begin as an apprentice. After at least three years of apprenticeship he could take a special Pharmacy Board Examination which would entitle him to practice pharmacy, but not to become the manager or owner of a store. To qualify for this, he had to work for one year as a pharmacist, then study for one and one-half years at the University and pass a series of examinations (Apothecary Examination).

TABLE I

HOURS PER WEEK FOR EACH SUBJECT LEADING TO THE ARTIUM DEGREE IN THE SCIENCE SEQUENCE

Subject	Hours per Week					Total
	1st year	*2nd year*	*3rd year*	*4th year*	*5th year*	
Religion*	2	1	1	1	1	6
Norwegian	4	5	5	5	6	25
German	5	6	2	—	—	13
English	4	4	4	4	—	16
French	—	—	4	4	4	12
History and Social Studies	2	2	2	3	5	14
Geography	2	2	3	—	1	8
Biology	2	1	—	2	—	5
Physics	2	2	—	6	6	16
Mathematics	5	5	6	5	7	28
Descriptive Geometry	—	—	—	1	1	2
Drawing	2	2	—	—	—	4
Chemistry and Physiology	—	—	4	—	—	4
Manual Training	2	2	—	—	—	4
Physical Education	2	3	4	4	4	17
Singing	1	1	1	1	1	5

* Lutheran Church is established as a State Church, and the religion taught is the Lutheran-doctrine.

Although this last part of the old curriculum was under the auspices of the University, the students did not have to meet the admission's requirement to the University, and the degree was not a University degree.

In 1912, a committee started to study the problems of pharmaceutical education for the purpose of revising the existing curriculum. It finished its report in 1914. However, nine years passed before the proposal of the committee was adopted by the Parliament (1923), and another eight years before the new curriculum was finally put into practice (1931).

In the new program, the entrance requirement was raised so as to conform with University regulations. The University selected the student on the basis of intellectual ability, and the degree granted became a recognized professional university degree. This new curriculum, which was patterned after a Swiss pharmacy curriculum of 1912, divides the program of pharmaceutical education into three sections or divisions. Instead of starting as an apprentice, the student begins his education in pharmacy at the University level by taking three semesters (one and one-half years) of basic sciences. He then leaves the University and works in a pharmacy under the supervision of the manager or owner. After one and one-half years as a trainee, the student goes back to the University for three semesters of professional education. By first obtaining a background in the basic sciences, the student is better prepared for practical training in a pharmacy and is able to utilize his time more efficiently.

Norway, which has a population of about three and one-third million, has one institution for pharmaceutical education. This is the Pharmaceutical Institute of Oslo University. This Institute was constructed in 1931 and is still one of the most modern and best equipped schools of pharmacy in Northern Europe (Fig. 1).

About thirty students are admitted each year. Competition is very keen, and only those Artium holders with the very highest grades are accepted. There is equal opportunity for women and men.*

The subjects are not taught as separate courses on a unit basis as in the United States. A given number of lectures per week has been allocated to each subject for either one or two semesters. Within this framework is included the subject material ordinarily covered in several courses in an American pharmacy curriculum. The laboratory instruction in several of the major subjects is not regulated and confined to definite laboratory sessions. The laboratories are open from 8 a.m. to 6 p.m. five days a week. The students can work there during that time when they are not attending lectures. This system has both its advantages and disadvantages. It tends to lead to more independent work, but is also known to result in much wasted time. The students are apt to spend much more time in the laboratories than is actually necessary to finish the assignments if the time were utilized more efficiently.

First Division. Table II shows the subjects taught and the time devoted to didactic as well as laboratory instruction during the first division of the curriculum.

Second Division. After one and one-half years, the student leaves the University to become a trainee ("praktikant") in a pharmacy. The University has no direct control over this part of the program for pharmaceutical education. It is administered by the Office of the Director General of Health Services. The student makes the arrangements with a pharmacy owner, usually in his home town.

During a minimum of seventeen months of full-time work, the student must take part in and become familiar with all the various operations required in a Norwegian pharmacy. The pharmacy owner, who employs a trainee, is in turn morally—if not legally—obligated to supervise the student's work and help him derive maximum benefit from this training period.

In addition to the practical work, the student must also learn the most important laws and regulations governing the sale of various types of medicaments and poisons. He must learn to use the many handbooks and compendia available in a pharmacy and must become thoroughly familiar with the pharmacopeia.

The second division is concluded by an examination at the Pharmaceutical Institute. This examination resembles our State Board Examinations. When the students have passed it, they obtain the right to practice pharmacy, but only in the capacity of a pharmacist employee. To qualify for the privilege

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*This has created a serious problem which is also well recognized in the United States. Statistics show that one out of every seven female students and one out of every twelve male students discontinue their education before graduation. Later on the difference becomes even more apparent. After a few years of practice, about 40 per cent of the women and only about 7 per cent of the men have left the profession (2,3).

FIG. 1. PHARMACEUTICAL INSTITUTE, OSLO UNIVERSITY, OLSO, NORWAY

FIG. 2. DR. A. NORDAL, DIRECTOR OF THE PHARMACEUTICAL INSTITUTE, OSLO UNIVERSITY, OSLO, NORWAY

DR. NORDAL IN ADDITION TO BEING DIRECTOR OF THE INSTITUTE IS ALSO PROFESSOR OF PHARMACOGNOSY. HE RECEIVED HIS PH.D. FROM OSLO UNIVERSITY. HE IS ACTIVE IN TEACHING AND RESEARCH. DURING 1953-54 HE WAS IN THE UNITED STATES ON A FULBRIGHT FELLOWSHIP AND WORKED IN THE RADIATION LABORATORY OF THE UNIVERSITY OF CALIFORNIA. DR. NORDAL IS CURRENTLY SERVING AS AN EXPERT FOR THE UNITED NATIONS IN BURMA ASSISTING THAT COUNTRY DEVELOP ITS PHARMACEUTICAL INDUSTRY FROM DOMESTIC RESOURCES.

of managing or owning a pharmacy—and also to earn the higher salaries—it is necessary to complete the third division of the curriculum. Practically all students continue for the final degree (Apothecary Examination).

Third Division. This division, which also consists of three semesters, is the professional core of the curriculum. The number of hours per week as well as the number of semesters devoted to each subject are listed in Table III.

When the students enter the University, they have attained a high level of general education. However, since all sequences leading to the Artium degree are acceptable as a basis for admission, the students differ consider-

TABLE II

TIME DEVOTED TO THE SUBJECTS TAUGHT IN DIVISION I

Subject	Didactic Instruction		Laboratory	
	Lect. per week	*Total Semesters*	*Hrs. per week*	*Total Semesters*
Inorganic Chemistry[a]	6	1	Indeterminate[c]	2[b]
Organic Chemistry[a]	6	1	Indeterminate[c]	1
Botany[a]	2	2	4	1
Physics[a]	2	2	3	2
Mineralogy	1-2	1	—	—
Pharmacy (general)	1	2	3	2
Pharmacognosy	1	1	—	—
Pharmaceutical Latin	2	1	—	—

[a] In addition to the lectures, one to two hours per week are devoted to seminar meetings for more informal discussions of the subject matter.

[b] The laboraory work in inorganic chemistry includes qualitative and quantitative analysis, one semester each.

[c] Laboratories are open all day. The students work there between classes. See text.

TABLE III

TIME DEVOTED TO THE SUBJECTS TAUGHT IN DIVISION III

Subject	Didactic Instruction		Laboratory	
	Lect. per week	*Semesters Total*	*Hrs. per week*	*Total Semesters*
Pharmaceutical Chemistry[a]	3	2	Indeterminate[b]	2
Pharmacy[a]	3	2	Indeterminate[b]	1
Pharmacognosy[a]	3	2	5	2
Accounting	2	1	—	—
Pharmacy Laws	1		—	—
Bacteriology	2	1	3	1
Pharmacology	2	1	—	—
Biochemistry	1	2	1	2

[a] In addition to the lectures, one to two hours per week are devoted to seminar meetings for more informal discussions of the subject matter.

[b] Laboratories are open all day. The students work there between classes. See text.

ably with respect to their background in two important subjects, namely, mathematics and physics. No course in mathematics is taught in the pharmacy curriculum which, therefore, is geared to the level of mathematics reached in the language sequences of the "gymnasium" (intermediate algebra and trigonometry). In spite of this handicap—which also exists in most American pharmacy curricula—the strength of pharmaceutical education in Norway lies within the physical sciences. The three semesters devoted to professional and scientific education in pharmacy might seem rather inadequate; and, to be sure, there are many deficiencies. In the subjects of pharmacy, however, Norwegian pharmacy students probably receive as thorough an education as students in most American schools of pharmacy still operating under the four year program with no previous college education. It might be expostulated that Norwegian students are often taught a mass of specific and isolated facts with the result that they tend to lose sight of the general principles which correlate and explain these facts. There also seems to be considerable lack of coordination and integration of the various subjects. Great emphasis is placed on developing skills and techniques, often at the expense of a sound understanding of the fundamental theoretical aspects.

Instruction in the field of pharmacy administration is limited to pharmaceutical law and accounting. The important subjects of economics, management and marketing are not taught.

The weakest part of the curriculum is in the area of biological sciences. Since the students have no background in anatomy or physiology, the few lectures devoted to pharmacology can give only a very superficial and sketchy introduction to this subject. Pharmacology was long considered exclusively the domain of the medical profession and none of pharmacy's business. This attitude has now changed considerably, especially among the younger members of the profession, who are beginning to realize the importance of pharmacology as one of the fundamental supporting sciences of pharmacy.

Examinations. The examinations during the pharmaceutical curriculum in Norway consist of written, oral, and practical laboratory tests. They are for the most part given at the end of each division. There are two written comprehensive tests—one for the second and one for the third division. The latter may be selected from any subject taught during the whole curriculum. Usually it involves writing a treatise on a rather large topic with a discussion of its pharmacognostical, chemical, and pharmaceutical aspects. A total of six hours are permitted for this test, and the test papers are graded anonymously.

Oral tests are given in each subject. These are conducted by the course instructor ("Examiner") and a second examination judge ("Censor"), not directly involved in the instruction of the course.

Practical laboratory tests are given in qualitative and quantitative analysis, pharmaceutical analysis, pharmacy, and pharmacognosy.

NEW PROGRAMS PROPOSED FOR PHARMACEUTICAL EDUCATION IN NORWAY

Pharmacy educators as well as practicing pharmacists in Norway have been aware of the shortcomings of their program for pharmaceutical education for a good many years. In 1946, a committee was appointed for the purpose

of organizing a new curriculum. The committee consisted of representatives from the University, the professional pharmaceutical organizations, governmental agencies, and pharmacy students. It finished its work in 1951, and the new program now awaits approval by the Parliament.

No major changes have been adopted, but the more flagrant deficiencies of the present curriculum will be corrected. First of all, the admission's requirement will be the Artium degree from either the Science Sequence or the Biology Sequence. This will give the students a better and more uniform background in mathematics and physics. Consequently, the physics course in the first division of the curriculum will be reduced (to the equivalent of two units instead of four). Instead, a course in physical chemistry (equivalent to three and one-third units) will be added. Courses in physiology, pharmacodynamics with bioassay and applied psychology (corresponding to the equivalent of four, six, and one units, respectively) will be included in the third division. This third division will also be lengthened by one semester during which the students are expected to do a piece of experimental research work in one of the major areas of instruction.

These changes certainly constitute important improvements. To an American pharmacy educator, the curriculum may seem too rigid, lacking as it is in elective courses that would give the students an opportunity to follow and to develop further their own special interests within the profession. This deficiency is—to some extent at least—filled by the special research program where the students will be encouraged to exercise their own ingenuity in discovering for themselves topics that they would like to study. There is no doubt that independent research work is an excellent teaching tool. If the students can be introduced to the research point of view, discover the value of independent scientific thinking and learn to apply scientific principles to pharmaceutical problems, they will have had a most valuable experience. To accomplish this with a whole class of students is, however, going to be a difficult task that will present a real challenge to the teaching staff.

The practice of pharmacy in Norway demands greater knowledge of the technical aspects of pharmacy than is needed in the United States. It is, therefore, understandable that the period of practical training plays a very important role in the program of pharmaceutical education. This training period is also the most difficult to perfect both educationally and administratively. It is significant that most of the dissatisfaction with the present curriculum has been concerned with its second division. Obviously, not all pharmacists or pharmacy owners are equally suited as instructors. It cannot be avoided that many will consider the student a source of cheap labor which may be used for just about any routine job of little or no teaching value. The pros and cons of a practical training period prior to or—as now—in the middle of the University curriculum are still being debated. Undoubtedly, the present system makes for more efficient utilization of the time for practical training. On the other hand, an interruption of the academic education by one and one-half years is very unsatisfactory. In that time, the students will forget much of the fundamental knowledge they learned in the first division. It has also been stated—and apparently with some justification— that if the students start their pharmacy education as trainees in a pharmacy, they will in a relatively short time find out whether or not

they are suited for the profession. This, in turn, will lead to pharmacists that have a more positive attitude toward the practice of pharmacy (4). In the present curriculum—it is maintained—the students do not become familiar with their chosen profession until they, for economic or other reasons, find it too late to change to some other field. The result is often a disillusioned and a dissatisfied pharmacist. In this connection, it seems worth pointing out that the programs for pharmaceutical education in Sweden and Denmark, where pharmacy practice is very similar to that of Norway, include a period of practical training as a prerequisite for admission to the school of pharmacy.

The committee working on the revision of the present curriculum was divided as to where the practical training period should belong in the program. The majority favored the present system. Both factions, however, proposed that the practical training should be acquired in specially authorized "teaching pharmacies." These teaching pharmacies should have a highly qualified staff and up-to-date equipment and facilities so as to be well suited for pharmacy instruction in the many practical aspects of the profession of pharmacy. The student representatives on the committee proposed that the teaching pharmacies be located in Oslo where the trainees could maintain contact with and also actually attend certain courses at the School of Pharmacy.

The future of the second division of the pharmacy curriculum is still not clarified. The Department of Social Affairs is opposed to the idea of teaching pharmacies. It is, therefore, possible that this most-complained-about part of the program of pharmaceutical education may remain essentially unchanged.

There is no doubt that the system of pharmacy practice and administration used in Norway has resulted in very high professional standards. At the same time, this system carries with it certain aspects that are a source of constant irritation and frustration among the more ambitious members of the profession. The main issue is the high age necessary for advancement to the position of pharmacy "owner." Young, competent pharmacists, with a desire for the challenge and responsibility that go with the administration of a big organization, will not be able to see their ambition realized until twenty to thirty years after graduation. At the same time, the pharmacists feel that they are bogged down with too much routine work which contributes little or nothing to their professional growth. This leaves them very little opportunity to devote themselves to the type of work that requires their special education and insight.

To improve this situation, the suggestion has been made to educate two categories of pharmacists. In addition to the pharmacists that graduate from the improved present curriculum—we may call them "A-pharmacists"—a new category with a shorter academic education would be established ("B-pharmacists"). The number of students admitted to the "A" curriculum would be considerably reduced. After graduation they should assist in the administration of the pharmacies, and organize and supervise the work done in the various departments (department managers). They should also maintain contact with the physicians, dentists, and veterinarians and be their advisers in pharmaceutical problems. In order to serve in this capacity, they should be able to devote enough time to keep up with the rapid development within pharmacy and related fields.

The educational program for the "B-pharmacists" would consist of an

apprenticeship of about three years followed by a collegiate education of one and one-half years. They would take over much of the daily technical routine work both in the prescription department and the manufacturing laboratories.

The idea of two categories of pharmacists was proposed in 1947 by Dr. B. Samdahl, Professor of Pharmaceutical Chemistry at the Pharmaceutical Institute. During the past ten years his proposal has been thoroughly studied by various committees and pharmaceutical organizations. Weighty arguments have been brought forth for and against the proposed program. It is still too early to say what the final outcome is going to be. Recent developments have given considerable momentum to the idea of two categories of pharmacists, and it stands a fair chance of being adopted in the foreseeable future in spite of the fact that the majority of pharmacy educators are opposed to it. It may be mentioned that a similar system has been in operation in Sweden for several years and apparently with considerable success. It is interesting to note that the "B-pharmacists" ("receptarier") in Sweden consist almost exclusively of women.

SUMMARY AND CONCLUSIONS

It is difficult to evaluate the Norwegian program for pharmaceutical education in terms of American educational practices and ideals. I shall, therefore, refrain from making any direct comparisons. The differences in pharmacy practice result in a different emphasis on many subjects.

The students admitted to the pharmaceutical curriculum in Norway constitute a very select group of young men and women. They have a background of general education that compares favorably with that acquired after two years of American college education.

In the curriculum itself there is considerable emphasis on laboratory techniques, especially with respect to analytical procedures. This is understandable in view of the fact that drug analysis is an integral part of the work done in a Norwegian pharmacy. The curriculum is weaker in its treatment of the theoretical aspects of chemistry. This will undoubtedly improve in the new program when the students will have a greater knowledge of mathematics and physical chemistry. The subject of pharmacy is taught on a very high level, professionally as well as scientifically. The same holds true for pharmacognosy. Pharmacy administration, on the other hand, is badly neglected, and there is no indication that this situation will change in the near future. The major deficiencies of the present curriculum are found in the area of biological sciences, but it is expected that the new program will bring about considerable improvements in this field.

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DOCTORAL AND POSTDOCTORAL STUDY IN GERMANY

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The statements in this article are not made in reference to any particular individual or institute, but rather they are based upon general observations and conversations with various university personnel, both German and non-German. There will be first a general discussion of the philosophy and practices in the German university, and, finally, specific reference will be made to advanced pharmaceutical training.

First things should come first, and so the status of the professor will be mentioned at once. Not only is the full professor the most important individual in the universty, but he is the most highly respected citizen in Germany. Confirmation of this fact was reported recently by one of the large German newspapers in a Gallup-type poll (1). Even the most humble and untrained peasant honors him. The power of the title *Doktor*, which pertains to the graduate of a university, is well known; less familiar is the fact that the title *Professor* is the one of greatest distinction in Germany. And strange to say, even the salary of a professor ranks with that of the military leaders who traditionally receive the highest salary among those on a fixed income.

While the tremendous respect shown the professor is oftentimes embarrassing but undeniably a refreshing change for the visiting American academician, the question arises as to whether or not there is a sound basis for the homage paid to German professors. I am convinced that there is, for the would-be professor must survive a severe and lengthy process culminating in his ***habilitation***. At the conclusion of his doctoral training, a superior student is occasionally encouraged by the director of an institute to remain there to conduct original research, and to work toward the rank of *Dozent*. When his performance is inadequate, a candidate will not be encouraged to continue, and those who survive must publish either one comprehensive paper or four lesser ones, in order to provide a second thesis which must be approved by the faculty of science and mathematics. In addition to a thesis, the candidate must pass oral comprehensive examinations in all branches of science. The successful scholar will finally receive the degree *Dr. Habil.* and become designated as *Dozent* if a salary is paid, or as *Privat Dozent*, if the institution does not provide him with a regular salary. The economic status of the *Privat Dozent* is not favorable, since his income depends upon the stipend of an assistant and upon the number of students he can cajole into listening to lectures.

The *Dozent* may now assign research problems to students and publish jointly with them, but he can not examine candidates for the doctor's degree until he has been called by the faculty of some university and designated as professor *extraordinarius*, and later as professor *ordinarius*, essentially the highest title in Germany.

Once the title of professor has been granted, the world takes on a heavenly hue for the recipient. Now everything is done by others for him, and he can do

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*The author was a Fulbright Professor, University of Tuebingen, Germany, 1955-56. The author wishes to thank Dr. Zalfarullah Cheema who helped to provide factual information for this article.

no wrong, for his word is law. He may even retire at full pay once he has attained the high goal. It is small wonder that a European professor may become remarkably self centered, egotistical, temperamental, and inconsiderate of the needs of others. The impression received is that nothing must interfere in the slightest degree with the fulfillment of the destiny of this demi-god in the realm of learning. Yet the wife of such a man will almost always be a most charming and thoughtful person. The observer is happy to acknowledge that the younger professors, most of whom have traveled abroad, are not so inclined to follow this cult of professorial infallibility.

Despite any criticism which might be made of the German professor, one can not question the fact that he is a proven scholar, but in America such is not necessarily the case. While it is true that many teachers in our country have completed independent research and crossed hurdles equivalent to those of the *Dozent*, it is unfortunate that the title professor has been badly misused, formally by colleges and universities which grant it, and, informally, by those who reserve it only for a teacher who does not hold the doctorate or by those who so designate the piano player in a saloon. Ironically, the title of professor in America is inferior to that of doctor, whether in reference to the Ph.D. or M.D. I once overheard two medical doctors, both educators in prominent universities, snickering over the fact that they differentiated between M.D. and Ph.D. teachers by referring to the latter as professors. This practice, which is incomprehensible to the German who has a high regard for the Ph.D. and the deepest respect for the title of professor, may be explained upon the basis that early America knew only the medical doctor and placed him upon a pedestal for both his learning and ability to heal the sick. Even during recent decades, when the number of Ph.D. degrees has greatly increased, the pattern has been so thoroughly set that *doctor* has been used as a title when it could be in order to indicate that the professor had more than a master's degree.

It may be of passing interest to note that in Germany a letter is addressed to Professor Braun as follows: "Herr Professor Dr. A. Braun." In speaking to him, everyone would say "Herr Professor," except another professor who would say "Herr Braun" or "Herr Kollege." Everyone addresses the holder of a Ph.D. as "Herr Doktor," except another doctor or a professor. The wife of a professor or doctor follows the practice of her husband in addressing others, and she is addressed according to the same practice. For example, the average citizen would say: "Frau Professor." These rules are rigidly adhered to. I know, for example, that an institute was rocked to its foundations when a visiting American professor inadvertently addressed a young German Ph.D. as "Doktor" and, in reply, received only the salutation "Herr."

The tremendous prestige and power of the professor in Germany has a fundamental influence upon the university system, and, hence, upon the product of the system, which is the graduate. One can say that in America the university serves the student, while in Germany the university serves primarily the professor. An institute appears to be organized to enhance the reputation of the director, who may at times be the only professor in the institute. Doctoral candidates, postdoctoral students, assistants, and *Dozenten* all contribute in some way to the prestige of the professor. They supply laboratory data which afford him, as the senior author, many publications. They serve him in many capacities as literature searchers, as guardians of special equipment or of the library, and in numerous ways which keep the more menial or time-consuming duties of the professor at a

minimum. And the absolute subservience—often of the ninety-degree backbending type—of students and personnel of an institute thus promotes the career of the professor to the fullest degree. There is little wonder that many prolific scholars and Nobel laureates have been found among German professors.

It was in Germany that the Ph.D. degree first reached full flower, and this was strikingly so in the chemical and pharmaceutical sciences. This tradition of accomplishment has deeply impressed most scholars and certain laymen in this country. To illustrate this fact, a newly enrolled freshman once called upon me in search of advice concerning his planned early transfer to a German university, where he said he would find the best possible scientific training in the world. Also, Germans have a very high opinion of their universities; they call them *ausgezeichnet* or the best. However, German scholars who read the journals objectively or who have visited our universities are often impressed with our system, and they have doubts about the assumed perfection of German universities. How can this be?

A year ago I entertained in our university a distinguished German director of a medical institute, who had been very hospitable to me during my year in his country. The most impressive sight on our campus to him was the statue of law Professor Green holding his arm about the shoulder of a young student. Said the German professor: "We must grow closer to our students!" Having spent a year in Germany I could appreciate that such a student-professor relationship is unknown in Europe. In 1951 there were fifty-six students for each professor in Germany, and, in certain institutes, I know that this ratio has increased. It is not surprising that a professor says often to his students: "Ich habe keine Zeit!" However, in view of the high qualifications of the German professor, it might be argued in reply that a student might gain more from infrequent conferences with such a man than from frequent talks with an average young, less-experienced American teacher. Further, with much of his time consumed in the writing of applications for research grants and progress reports and in the performance of menial tasks, none of which is done by the European professor, too little time is available to the active, experienced American professor for consultation with students and for creative work.

A further criticism of the German system centers around a virtual absence of written examinations, such as our comprehensive examinations or written examinations, based upon required attendance at lectures. Thus, there is little doubt in my mind that the doctor's degree is more readily attainable in European countries than in America. The last two or three years of training in Germany and Switzerland are devoted almost entirely to the pursuit of a thesis, while in America much of this time is spent in learning the content of survey and advanced courses and in the preparation for comprehensive examinations. But, most Germans are inclined to dismiss our system as inferior because it is unthinkable to compare any training with theirs which has always been unquestionably *ausgezeichnet*. When a comparison is allowed, American training, because of the rigid requirements in courses and examinations, is described as regimentation or devoid of academic freedom. The true student is considered to be one who studies alone because of pure interest. However, the visitor must conclude that the graduate of the German-Swiss system is often deficient, for example, in chemical theory, possibly because the older professors who lecture are deficient in this area. Even in research training which is the forte of German education, the student is often such a specialist that he is unacquainted with the

professor's master plan of research except for the small area to which he has been assigned, and it is my impression that too often the professor is not inclined to give satisfactory answers to the student who might venture to question the reason for attempting a certain experiment. In all fairness, however, one can not say there are no similar tendencies in America. But the greater informality between student and professor makes them less likely.

The English lend support to the German criticism of our greater stress upon graduate courses and examinations. One who spent two years in our universities has stated (2): "It is fair to say that the volume of original work expected is distinctly higher than it is in the United States, but this is reasonable in view of the fact that the student has been working on his problem almost full time for three years. The American Ph.D. degree may represent more than three years of time, but much of this will have been taken up with graduate courses and examinations, ..."

Even the criticism of our system by Europeans and by those Americans who feel there is too much emphasis upon the rote learning of subject matter is no longer applicable to many progressive, alert universities, as shown by a excellent survey by a committee of American professors (3). Graduate students are now required to propose several original problems and to suggest solutions in place of extensive course requirements. The stress is also upon more seminars. In other words, the student learns the content of the courses, without forced feeding, through his attempts to solve hypothetical and laboratory problems.

In describing in a general way the customs and philosophy of higher education in Germany, I have covered the basic feature of training in the sciences. Now specific information regarding training leading to and including the pharmaceutical sciences will be offered.

By the time the student has completed his training in the *gymnasium*, or similar school, and has passed the *Reifeprüfung* for the *Abitur*, he has left many classmates along the wayside, for only the very best scholars attain the *Abitur*. He is about nineteen years of age and is virtually assured because of the *Abitur* of completion of university studies, through the doctorate if he wishes. In knowledge of subject matter, this student ranks among the very best of those entering the junior class of an American university. In social adjustment, he usually falls far short of his American counterpart whose nose has not been so continuously kept at the academic grindstone, and whose personal life has not been so thoroughly regimented.

The student who is interested, for example, in chemistry may listen to lectures for one or more semesters in a university or *Technische Hochschule* and then migrate to another until he has heard the scholars of several different institutions. Finally, he will settle down for at least the last three of a maximum of eight years of study beyond the *Abitur* in either a chemical, pharmaceutical chemical, or biochemical institute, where he will complete work for the Ph.D. (in science, it is actually designated, *Doctor rerum naturalium*).

If one is to become a practicing pharmacist, he will not pursue the doctor's degree, but 5 years will elapse between the *Abitur* and the taking of the *Staatsexamen* which corresponds to our state board examinations. The first two of the five years are spent in practical work in a pharmacy prior to entrance to the university, where three years are spent. (This curriculum will be described by Dr. Sonnedecker in another article to appear in the Spring issue.) A number of

excellent students may decide to forgo careers as pharmacists to continue work toward the doctorate. Ordinarily, about three additional years are required.

Now I shall briefly describe the organization of a typical pharmaceutical institute in Germany. In fact, the institute will probably be named Institute for Pharmaceutical Chemistry. Such an institute will be presided over by a director who is also a full professor (*ordinarius*) and whose field of interest may vary from botany to theoretical organic chemistry. The point I wish to make is that the universities, in selecting directors, are primarliy concerned in having first-rate research scholars regardless of their specialty. One institute, for example, is presided over by a theoretical organic chemist who had no pharmacy training even though he has hundreds of pharmacy students under his supervision. It is significant that his scholarly attributes are such that he concentrated so thoroughly upon pharmaceutical subjects, during a period of three months prior to his assuming his directorship, that he wrote manuals which are now used by pharmacists.

The typical institute which is being described may have 300 pharmacy students who are studying for the *Staatsexamen*, and perhaps twenty to forty more students who are continuing their work leading to the doctorate. A staff of twenty-six is composed of two professors, eight full-time and five part-time teaching assistants, a secretary, a house master who lives in the institute, one work master, two assistants for demonstrations, three storeroom men, and three cleaning women. The equipment and instruments which I saw in several institutes —especially that for research—is unbelievably modern and abundant. It is superior to anything I have seen in a comparable research group in America. Here is striking evidence of the full support given to research and scholarly attainment in Germany. It is ironical that during the period following the last war when our country was sending much economic aid to Germany, their institutes were being granted abundant support from their governments.

The research conducted in the typical pharmaceutical institute is limited to pharmaceutical chemistry. It is either in synthesis or plant chemistry. To my knowledge, there is no research performed except in industry in an area designated often in our country as "pharmacy," and research in pharmacognosy is conducted in a botanical institute. Likewise, pharmacology is pursued in another institute.

Thus, in effect, one can see that the study of pharmaceutical chemistry is the primary aim of the institute, and there is no such course as dispensing pharmacy. Nevertheless, pharmacy is on a higher level, and it is far more professional in Germany than in America. Paradoxically, also, the pharmacy student receives little attention from the senior staff, and the senior staff is too small. Undoubtedly, the law which limits the number of pharmacists is a very important factor in the thriving prescription business which is highly conducive to the professional atmosphere of the pharmacy.

A closer look at the curriculum of the doctor's candidate in a pharmaceutical institute will reveal that his training is essentially that of a chemist in either of the other chemical institutes. Even the research may be theoretical chemistry if that happens to be the professor's field. As we have earlier indicated, there are no written examinations. Rather the training consists of the completion of a fixed number of analyses and preparations, and the attendance at lectures. If the student has not yet transferred to the pharmaceutical institute, he will be

examined orally by a group of professors of the chemical institute in organic, inorganic, analytical, and physical chemistry, as well as physics. This is called the *Vordiplom* examination. After about two more years of study, there comes the *Diplom* examination which consists of oral examinations in three of the four branches of chemistry. These examinations require much preparation, for they may be very severe. (Ordinarily, foreign students who hold the bachelor's or master's degrees are not subjected to these examinations.) At this stage, such a student, or one who has instead taken the *Staatsexamen*, will enter the institute for the commencement of research. After the completion of the thesis, he is examined orally in organic and inorganic chemistry and physics. Physical chemistry may be substituted for organic or inorganic. A fourth subject may be chosen from pharmacology, geology, etc. An interesting feature of the final examination is that the candidate is examined in private first by one professor and then another. The degree is granted by the *Naturwissenschaftlich* faculty of the university, for the examiners come from various institutes of this faculty, and the degree will be *Dokter der Naturwissenschaften* or, in Latin, *Dr. rer. nat.*

A final word might be said concerning study by Americans in Germany. This subject reminds me of the unusual comment by a fine woman physician who is a member of the teaching staff of a German university. She wondered why an American would wish to study science in Germany. Such a comment could have come only from one who was capable of objective consideration of the current scientific literature. Before World War I, Americans learned much from taking the doctor's degree abroad. In fact, it provided a basis for the granting of the degree in our country. Now, except for the historical background in science, the attribute of getting to know the people of another nation and the sheer pleasure of traveling in Europe, I am convinced that there is no longer any need for the science student to take a doctorate away from home. This is not to say that tremendous advantage would not accrue from viewpoints and techniques to be seen abroad. The B.S. or M.S. graduate can obtain the doctorate within three years in Germany, but he will be disappointed at the content of the lectures which he has probably already heard as an undergraduate, and he might feel that he is noticed too little by his professor. This latter feature might be particularly worrisome to the postdoctoral student in Germany, for as a graduate student at home he undoubtedly received far more personal attention. At any rate, one planning to study abroad should learn all he can about the personality of his future research director, particularly from another American who knows him well. Usually, the younger professor in Germany who has visited America would be the best choice for a research adviser.

One of the greatest lessons that the student realizes while studying abroad is that the American student at home abuses his democratic privileges.

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PHARMACEUTICAL EDUCATION IN INDIA*

V. N. BHATIA

In recent years pharmaceutical educators in America have come in contact with many graduate students from India. This has resulted in some understanding of pharmaceutical education in that country. However, one basic fact that is often not understood is that most of these students have followed an undergraduate curriculum whose aims and objectives are quite different from ours. In America the course of studies leading to a B.S. degree in pharmacy is primarily designed to educate students for a career in retail pharmacy; in India the main objective of such a degree is to prepare students for work in the pharmaceutical industry, and the training for retail pharmacists is still provided by a two year nondegree course or through apprenticeship.

The reason for the relatively backward educational standard for the retail pharmacist is both historical and economic. The retail pharmacist or "compounder," as he is called in India, engages in work which has very little professional or social prestige in that country. Unlike the American pharmacist, he has not been regarded as a consultant and authority on drugs, but merely as a dispenser of medication who may or may not have knowledge of the drugs he handles. Also, the economic status of the pharmacist is extremely poor. Consequently, it is not a profession which attracts young men with the ambition, ability, or the finances to aspire to a career which would give them social status and economic gains. Such persons, if they are interested in pharmacy, follow the curriculum leading to the bachelor's degree and usually work in the pharmaceutical industry.

There are attempts being made to correct this situation, but so far the progress has been slow. The government has passed the Pharmacy Act of 1948. When this act is fully enforced only those persons having at least the "Diploma in Pharmacy" (two year course) followed by 750 hours of internship will be eligible for registration as pharmacists. However, such a requirement at present would be highly impractical since there are only about six places where the "diploma" courses are offered, and the total enrollment in these courses is probably under 500. So, for the present, four years of experience in dispensing qualifies one for registration.

The five year course leading to a bachelor's degree is much more attractive to the prospective students, who upon graduation from this course can look forward to a much more rewarding career in industry. In India the pharmaceutical industry is relatively old, and there are several small and medium-sized manufacturing houses. Although it is only recently that most of them have started developing research staffs, they are well enough established to have withstood postwar competition from abroad.

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* The information in this article is based on the following sources: 1. Questionnaires sent to the colleges of pharmacy in India and completed by five of the eight colleges, 2. Personal communication from Dr. D. K. Santra, Head of the Dept. of Pharmacy, Birla College, Rajasthan, India, 3. The author's personal experiences as an undergraduate and manufacturing pharmacist in India.

THE PHARMACEUTICAL CURRICULA

In the following description of the two types of curricula, the two year, nondegree or "diploma" course is briefly discussed because only limited information is available, and also because it is taught by a few universities. The course leading to the bachelor's degree is discussed in more detail because it is the one emphasized by the colleges and also because it is important to us in evaluating prospective graduate students from India.

The Nondegree Course. This course (leading to the "Diploma in Pharmacy") consists of two years of college work following graduation from high school. The first year is mainly devoted to such fundamental subjects as chemistry (mainly inorganic), physics, botany, zoology, and English. Standard laboratory instruction is a part of the scientific courses. The second year is devoted to professional subjects. These consist of the following:

1. General Pharmacy
2. Dispensing
3. Forensic Pharmacy
4. Pharmaceutical Chemistry
5. Pharmacognosy (microscopic)
6. Elementary Anatomy and Physiology
7. First-Aid

It is difficult to assess the quality of training given in such a program, but it might be safe to assume that much of the material is taught at a very elementary level because of the lack of time and preparatory college work.

The Degree Course. There are at least eight institutions offering degrees in pharmacy. They are:

1. Andhra University, Waltair.
2. Banares Hindu University, Banares.
3. Birla College, Pilani.
4. L. M. College of Pharmacy, Ahamdabad.
5. Madras University, Madras.
6. Panjab University, Amritsar.
7. University of Saugor, Sagar.
8. University Department of Chemical Technology, Bombay.

The first seven offer a Bachelor of Pharmacy (B.Pharm.) degree which requires five years of college work. The first two years consist of preprofessional work in chemistry, physics, and biology, or mathematics. Following this the students are admitted to a college or department of pharmacy for three years of professional education.

The last-named institution, the University Department of Chemical Technology, offers an entirely different program leading to the degree of B.Sc. (Tech.) in Pharmaceuticals and Fine Chemicals and requiring six years of college. The first four years are spent in preprofessional work leading to a B.S. degree with a chemistry major and a botany minor. The two professional years that follow lean heavily towards "pharmaceutical engineering,"

and the curriculum includes work in elementary chemical and general engineering, engineering drawing, etc. in addition to the pharmacy subjects.

The following table shows some of the subjects taught and the clock hours of lecture and laboratory time for the B.Pharm. degree. The clock hours are approximations of averages for all colleges rather than actual figures for any one college.

	Lecture Clock Hours	Laboratory Clock Hours
Theoretical Pharmacy and Pharmaceutical Preparations	60	110
Dispensing	60	140
Manufacturing Pharmacy	40	120
Pharmaceutical Arithmetic	15	.....
Pharmaceutical Chemistry and Drug Assay	150	300
Pharmacognosy	100	200
Pharmacology	60	80
Pharmacy Administration	100	.....
Biochemistry	60	60
Physiology	60	100

In addition some colleges require courses in organic chemistry, physical chemistry, cosmetics, food analysis, etc.

The courses listed are often similar to those offered in this country, although in some instances the emphasis may be different. Standard British textbooks are generally used. The courses in theoretical pharmacy, pharmaceutical preparations, pharmacognosy, and drug assay would compare quite favorably with corresponding courses in American colleges of pharmacy. Laboratory equipment and work in these areas is quite good, and the students are well instructed in fundamentals and techniques. On the other hand, courses in dispensing, physiology, pharmacology, and bacteriology may not compare as favorably. The latter two courses are usually taught by physicians who may not necessarily have advanced training in them. In India pharmacology and bacteriology are still considered strictly "medical" subjects, and the few people specializing in them are primarily physicians.

Apart from this one shortcoming, colleges of pharmacy in India seem to be adequately staffed. Most faculty members have advanced degrees, and about half have earned the Ph.D. or D.Sc. degree. In several institutions the senior faculty members hold degrees from American or European universities. The student faculty ratio is impressive, being as low as 5:1 in some instances.

The objectives of the five year degree course are clearly indicated by the positions held by the graduates of the colleges. Positions in the pharmaceutical industry either as manufacturing pharmacists or as analysts account for over 50 per cent of the graduates. Most of the others are employed as drug inspectors, drug control administrators, or medical representatives. Of the five colleges that supplied information for this article, not one listed retail pharmacy among the professions followed by their graduates.

For those who have had to evaluate the grades of a prospective graduate student from India and have been puzzled by the grading system, the following explanation may be helpful. When a student has passed all his courses he is classified as having passed in the I, II, or III division depending on his total numerical grade. The minimum passing grade is around 40 per cent and varies from 33 per cent to 45 per cent depending on the college. III division runs up to 45 per cent or 55 per cent, II division up to 55 per cent or 65 per cent, and any total grade above that earns a I division. A student securing 75 per cent in any subject is said to have graduated with honors or distinction in that subject. These may seem to be low grades for passing a course compared with the American system. However, in general it is just as difficult for a student to get a I division in an Indian college as it is for one to get a high B average in an American college.

In conclusion it should be pointed out that there are variations in offerings of the different colleges, and that the information given here is of an over-all and generalized nature. Information about individual colleges can be obtained from catalogues published by them. These are usually quite detailed in their description of curricular offerings. A section in these catalogues which makes very interesting reading is the one dealing with rules and regulations for student conduct. One becomes aware that Indian pharmacy students lead a much more spartan existence than do our students. The following are examples of some regulations (appropriately paraphrased for clarity):

"Smoking by students is strictly prohibited."

"Students shall maintain *absolute* silence and order in the college at all times."

"Students shall eat in the dormitory dining room. They are not permitted to eat elsewhere."

"Students shall not stay outside the dormitory at night. Roll call shall be taken daily at 8:30 p.m."

"Students shall be supplied with vegetarian food only."

"Each student shall use *only* one light bulb not exceeding 60 watts."

In case the reader should feel that this indicates a very harsh life, some relief is provided by the regulation which states:

"Students will not quarrel with their servants."

The person responsible for enforcing all these rules is the faculty member who serves as the resident counselor in the dormitory. In view of the strictness of rules that he has to enforce the resident counselor bears a very apt title. He is known as the warden!

I talk about nothing but what comes within the range of my experience.
Rufus A. Lyman, Am. J. Pharm. Ed., 2, 377 (1938)

BELGIAN PHARMACEUTICAL EDUCATION

THEODORE D. KING AND AUBIN HEYNDRICKX*

Pharmacien and *Apotheker* are the simple bilingual titles of the University degree granted graduates who successfully complete the five year pharmacy curriculum at a Belgian university and present the dean with a document certifying twelve months of practical work in a pharmacy. The pharmacy program, like those for medicine, dentistry, and veterinary medicine, is governed by statutes which specify the subjects to be presented for examination by the candidate for one of these degrees.

Each of the four Belgian universities has a department or institute of pharmacy operating under the faculty of medicine. The two national universities are the University of Liége and the University of Ghent. The former is the French language state university and the latter the Flemish one in this bilingual country. The two other private, or "free" universities, as they are known, are the University of Brussels where courses are conducted in French and the University of Louvain, a Catholic institution, which offers instruction in the two national tongues. Brussels and Louvain have the largest student bodies.

As in other professional programs, the course of study in pharmacy is restricted almost entirely to the major field and cognate courses. There are no language or liberal arts requirements other than brief philosophy and psychology courses in the first year at the university.

It is felt that the very rigorous secondary education of the collège (private school), athenée (boys' state high school), and lycée (girls' state high school) gives the student a strong enough general educational background. The university preparatory course required of all students majoring in the sciences, pharmacy, medicine, law, or philosophy is the Latin-Greek-Mathematics curriculum which offers six years of Latin and five years of Greek. The latter language is no longer required for university admission. Included are four or five years of a modern foreign language, usually English in addition to the two national tongues, French and Flemish.

Table I lists the course of study for the degree of *Pharmacien*. The first two years work is taken with all science, premedical, and preveterinary students in the university at large. At the end of that time, on successful completion of work and passage of examinations, the student receives a *Candidat en Sciences* certificate. The subjects for examination for this preliminary degree are specified by law, hence, the curriculum as outlined in Table I. This includes the basic science courses in physics, chemistry, botany, zoology, mineralogy, geology, and mathematics.

Lectures are an hour and a half in duration, and laboratories are three to four hours long, usually held from two to six in the afternoon. During the first year there are 17.5 clock hours a week lecture and 14 hours of laboratory. The second year, 11 and 17 hours respectively. As in America, the school year is nine months in duration and divided into two semesters.

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* Dr. King was a Fulbright Research Scholar, J. F. Heymans Institute of Pharmacology, University of Ghent, Belgium, 1955-56, and Dr. Heyndrickx was a Fulbright Fellow, University of Minnesota, 1951-53.

TABLE I

PHARMACY CURRICULUM, UNIVERSITY OF GHENT, BELGIUM

First Year—17.5 hours of lecture, 14 hours laboratory per week.

Philosophy and Logic
Psychology
Physics I (lect. and lab.)
Inorganic Chemistry I (lect. and lab.)
Organic Chemistry (lect.)
Mineralogy
Analytical Geometry and Infinitesimal Calculus
Botany (lect. and lab.)

Second Year—11 hours of lecture, 17 hours of laboratory per week.

Physics II (lect. and lab.)
Inorganic Chemistry II (lect. and lab.)
Organic Chemistry (lect. and lab.)
Zoology (lect. and lab.)
Botanical Physiology
Geology

Candidat en Sciences diploma awarded at the end of second year.

Third Year—10 hours of lecture, 25 hours laboratory per week.

Qualitative and Quantitative Analytical Chemistry (lect. and lab.)
Pharmacognosy I (lect. and lab.)
Inorganic Pharmaceutical Chemistry (lect. and lab.)
Organic Pharmaceutical Chemistry I (lect. and lab.)
Bacteriology and Hygiene (lect. and lab.)
Pharmacology (elective)

Fourth Year—10 hours of lecture, 29 hours laboratory per week.

Phytopharmacy (lect. and lab.) (elective)
Qualitative and Quantitative Analytical Chemistry II (lect. and lab.)
Inorganic Pharmaceutical Chemistry Laboratory II
Pharmacognosy II (lect. and lab.)
Drug Analysis (lect. and lab.)
Food Analysis (lect. and lab.)
Toxicological Chemistry (lect. and lab.)
Medical (clinical) Chemistry (lect. and lab.)

Fifth Year—5 hours of lecture, 7 hours laboratory, 45 hours practical experience per week.

Galenical (dispensing) Pharmacy (lect. and lab.)
Pharmaceutical Law
Pharmaceutical Deontology (Ethics)
Microbiology of Food (Elective)
Chemistry of Colloids (Elective)

The professional curriculum of the last three years is a strictly scientific one with no courses in accounting, economics, or pharmaceutical administration. The program is heavily weighted with pharmacognosy given during the third and fourth years. Great emphasis is placed on the analysis and identification of drugs. Organic and inorganic pharmaceutical chemistry courses cover the study of drugs belonging to these classes, their properties, preparations, and methods of identification. However, the organic course does not probe the relationships of chemical structure and pharmacological action, so characteristic of its American corollary.

The names of the course are, in general, self-explanatory. Phytopharmacy refers to the study of economic poisons such as insecticides, herbicides, rodenticides, and related products. Dispensing is the substance of Galenical Pharmacy of the last year. Toxicological chemistry involves the study and identification of poisonous substances in chemical as well as biological materials. Medical chemistry is clinical chemistry with accompanying laboratory exercises in urine and blood analysis. Pharmaceutical deontology is the study of the ethics of the profession.

An important omission from this curriculum when compared with the American one has been the lack of emphasis, or rather the omission of, pharmacology as a core course. Although lectures in pharmacology have been available as a "free" course to those interested, no adequate preparation in physiology was provided as a background. (A "free" course differs from the American elective course in that no examination is given at the completion of the lectures.) Neither laboratory work nor practical demonstrations accompany the pharmacology lectures. Biochemistry is also not required. The pharmacology deficiency is about to be abolished as the result of conferences on curriculum change which have been submitted to and approved by the medical faculties of the two state universities. The new changes provide for a course in anatomy and physiology and another in biochemistry as prerequisites for a compulsory course in pharmacology. These and other modifications in the curriculum must be approved by the Minister of Justice and ratified by an act of Parliament. Then the new pharmacy program will become official in all four schools.

The last year of pharmacy education differs radically from its counterpart in the United States. The fifth year student spends only twelve hours a week in the classroom and laboratory. The bulk of his time is spent in a practical internship in a retail pharmacy, hospital, or military dispensary. In order to receive his final degree the candidate must present a certificate showing twelve months work in such an internship. This internship or *stage*, as it is known, is closely supervised by the Ministry of Health, and the *stagiaire* must be registered in an approved pharmacy and must spend nearly full time in the pharmacy of his choice. The student, at his final examination, must present a journal record of all prescriptions, preparations, and assays of medicinal products, which he has performed during that time. The pharmacist in charge of the *stagiaire* must file an affidavit certifying the authenticity of the record as well as testifying to the regularity of the student's working hours.

The course credit system as we know it in the United States is not used in European education. Greater emphasis is placed upon completing the successive years of a given curriculum, and a student is classified thereby rather than by the number of semester or course credit hours. This makes

for a more rigid and rigorous program for the student because it is necessary for him to pass all of his courses in order to advance to the succeeding year. This is similar to the system in effect in many of our own medical schools. The student must stand or fall on the results of his final examinations which are given at the end of each school year. This examination period is set by law, and the code governing pharmacy specifies the examinations to be given even indicating the number of laboratory problems or preparations which must be included. Few if any examinations or quizzes are given during the progress of a course although laboratory experiments and preparations are graded as in American colleges. The final examinations, then, are all-important. Several weeks to a months may be provided between formal classes and the examination period so that the student may review during this time. If a course is given only in the fall semester, the examination will not be given until June. If the student fails an examination in one subject, he must repeat the entire year including those subjects he has passed. Opportunity for re-examination is provided in September, and the student may avoid losing an entire year by passing at that time. The student who is unfortunate enough to be placed in this position usually spends a most unpleasant summer boning up for this last chance.

Examinations, for the most part, are oral and, by law, must be public. The latter requirement is only nominally followed, however, in so far as the professor may fulfill this requirement by leaving the examining room door ajar. But few students are courageous enough to stand at the door to listen to their classmate being examined. However, examinations of candidates for higher degrees are well attended by students, faculty, and friends.

There is no grading system for individual courses. However, the professors do grade the individual examinations so that a grade for the year may be given the student. The results are read at a formal proclamation attended by the students at the end of the examination period. There it is announced that the student has simply passed the examinations or has attained Satisfaction, Distinction, High Distinction, or Highest Distinction. These are the closest equivalents of our letter or numerical grades. Passage with any of the levels of distinction is very highly praised as a mark of superior academic performance.

Several advanced degrees are open to those who wish to continue their studies beyond the five-year professional course. A proposed Certificate of Industrial Pharmacy is to be awarded following two years of specialization in advanced courses in biochemistry, analytical biochemistry, industrial toxicology, physiology, pharmacology, bacteriology, bioassay, and phytopharmacy plus industrial experience in industrial pharmaceutical technique. This certificate will prepare the student to enter the pharmaceutical industry and also to qualify for the post of Industrial Pharmacist required by a 1955 amendment by Royal Decree to the pharmacy laws of 1818 and 1885. This law requires that all drugs, including those at the manufacturers' level, be sold or dispensed under the supervision of a pharmacist. The Industrial Pharmacist under terms of this act will usually be the director of the pharmaceutical control laboratory.

Another specialized degree open to the pharmacy graduate is that of Licencié in Biochemistry. This is a one year program also open to other university graduates who may have degrees in chemistry, agricultural engineering, or even medicine. It is primarily designed for those who wish to

enter industry, and two types of majors under this program are offered, either analytical or industrial. Advanced courses in biochemistry, organic chemistry, bacteriology, microbiology, and elements of pharmaceutical engineering comprise the curriculum.

The doctor's degree (see Table II) in Belgium is similar to that offered in most Continental countries of Europe in that it is given on presentation of a satisfactory thesis which may represent one or more years of work on the research problem. Unlike the American doctorate program, no course work is required. The degree awarded is *Docteur en Sciences Pharmaceutique*. It is the usual terminal graduate degree. However, a higher degree involving another thesis is the *Agrégé de l'Enseignement Supérieur*. This degree is of primary significance for those who intend to go into university teaching and has usually been required for an academic appointment. However, this degree will soon be abolished in all faculties with the exception of medicine.

TABLE II

BELGIAN PHARMACY DEGREES

Pharmacien—Diploma awarded at end of five year curriculum.

Docteur en sciences pharmaceutiques—Diploma granted upon presentation of thesis representing one or more years of research at a university.

Agrégé de l'Enseignement Supérieur—Diploma granted upon presentation of thesis representing two or more years of research at a university.

Once the pharmacist has received his diploma in Belgium he is entitled to practice his profession without taking any additional state examinations. He merely has to register with the province in which he plans to practice and with "L'Ordre de Pharmaciens" an official body roughly corresponding to both an American State Board of Pharmacy and pharmaceutical association. This body has, by act of Parliament, national authority to set up and maintain rules for the practice of pharmacy and to oversee the ethical practices of the profession.

Through L'Ordre de Pharmaciens the practice of pharmacy is rigidly governed. Official statutes spell out in detail the minimum physical requirements for the prescription laboratory. Although prescription practice has changed in Belgium as it has elsewhere, the laws require that all drugs in the Belgian Pharmacopoeia must be kept in stock in certain prescribed quantities, that certain items of glassware be on hand, and also that there be a microscope in each prescription room. These requirements stem from the belief that the pharmacist should be able to assay a drug for purity if called upon to do so or to perform some of the basic procedures of clinical chemistry for which he is trained in the University. But under present-day conditions such tests are rarely performed in the pharmacy.

What the pharmacist can sell in his store is also closely restricted primarily to drugs and cosmetics. Other types of merchandise such as bulk chemicals, insecticides, cleansing tissues, and other miscellaneous items are sold in *drogueries* or drugstores. Very often a pharmacist may operate both types of store on adjoining sites, but the law prohibits a common entrance or connecting door between the two businesses.

In summary it can be said that the profession of pharmacy and pharmaceutical education are conducted with very high standards in Belgium. Undergraduate education is rigorous and thorough and is primarily concerned with the scientific aspects of pharmacy. Constant re-examination of the pharmacy curriculum is gradually introducing changes consonant with the professional needs of the country. Graduate education is different from that in the United States. The number of individuals with a doctorate of pharmacy employed in responsible research positions testifies to the success of this research degree.

. . . the first essential in an educated man . . . (is) to speak well his mother tongue and express his thoughts clearly and succinctly. It might also be added that in a sense the ability to speak well and write well is the professional man's greatest commercial asset, for it is the one thing above all things that inspires respect and confidence in one's patron and patient.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 372 (1937)

PHARMACEUTICAL EDUCATION IN THE NETHERLANDS

JAN S. FABER AND WALTER C. McCARTHY*

Seven years of appropriate training at the university level are required to secure the title of "Apotheker," with its attendant license to practice the profession of pharmacy in The Netherlands. This training encompasses all of the studies, with the exception of research and thesis, required for a doctor's degree in the faculty of natural sciences. It is not unusual for a student to complete this remaining work in order to be able to use the title of doctor in his professional endeavors.

Education in pharmacy is available at the State Universities in Groningen, Leiden, and Utrecht, and at the Municipal University of Amsterdam.

The Dutch school system seems to pursue its educational objectives more intensively than is done in the United States. As a consequence, the Dutch student entering the university has a broader educational background than his American counterpart. For example, a Dutch student, before entering the university, has a reading knowledge of English, French, and German, in addition to his native Dutch. His training in the arts and humanities is sufficiently advanced that his university curriculum can be devoted entirely to the professional fields of interest. Thus, the course of study of a first year pharmacy student in The Netherlands is remarkably different from that of a freshman pharmacy student in the United States.

The pharmaceutical curriculum in The Netherlands is divided into three degrees, candidaat, doctoraal, and apotheker. The usual period of study is three years for each of the first two degrees and one year for the apotheker degree, to make a total of seven years.

The course of study for the candidaat degree at Groningen is outlined in Table I. The numbers given are class hours per week for the academic year. (For certain courses that are given during only half the year, the actual class hours per week are divided by two in order to express them in terms of equivalent class hours per week for an academic year.) There are some differences in this program from one university to another. During the third year, the student is not expected to attend formal classes, but spends his time studying for examinations. He must pass "tentamens" or preliminary examinations in each of the several fields of chemistry and botany, physics, mathematics, and zoology. Then he is eligible to take the candidaat's examination, which is a comprehensive examination in the fields of chemistry and botany. Upon the successful completion of this, the student is admitted to the doctoraal curriculum in pharmacy.

During the first year after the candidaat's examination, the student follows instruction and practical exercises in order to prepare him for practicing in a pharmacy under the supervision of an apotheker. Upon satisfactory completion of these exercises, he receives a statement from the faculty of natural sciences that he is competent to practice under super-

* Dr. McCarthy spent the 1955-56 academic year in research laboratories of the University of Groningen, The Netherlands while on sabbatical leave from the University of Washington.

TABLE I

CANDIDAAT DEGREE

Subject	Class Hours Per Week for the Academic Year			
	First Year		Second Year	
	Lecture	Laboratory	Lecture	Laboratory
Chemistry	2			
Analytical Chemistry	1	3	1	9
Physical Chemistry	1		1	
Inorganic Chemistry	2	3	2	
Organic Chemistry	3	2½	1	12½
Physiological Botany	1		1	
Systematic Botany	1		1	
Botanical Anatomy	1	3		9
Cytology	1			
Physics	2	3½		
Algebra and Analytic Geometry	1			
Differential and Integral Calculus	2			
	18	15	7	30½

TABLE II

LECTURE COURSES FOR THE DOCTORAAL DEGREE

Hours Per Week	Duration (Years)	Course
1	3	Pharmaceutical Chemistry
1	2	Analytical Chemistry
2	2	Pharmacognosy and Galenical Pharmacy
1	2	Pharmaceutical Botany
1	2	Toxicology
1	1	Special Topics in Pharmaceutical Chemistry (Vitamins, Hormones)
1	1	Pharmaceutical Technology
2	2	Pharmacology
1	2	Art of Compounding, Dispensing
1	2	*Clinical Chemistry
2	2	*Microbiology
1	2	*Food Chemistry
1	1	*Biochemistry

* Elective minors.

vision. Instead of this statement of the faculty, the student may obtain an "Assistent-diploma," a nonuniversity degree, which conveys to the holder the privilege of practicing in a pharmacy under the supervision of an apotheker. Before he may be admitted to the final apotheker's examination at the end of the university curriculum, the student must have at least four months of practical experience in a pharmacy after receipt of this statement of the faculty or the assistent-diploma.

The curriculum for the doctoraal degree is divided into the major field and two required minor fields of study. Suitable minors for pharmacy students are analytical chemistry, pharmacology, biochemistry, clinical chemistry, microbiology, toxicology, and food chemistry. In each minor the student takes a lecture course of one or two hours per week for two years and an intensive laboratory course that occupies his full time (other than lecture hours) for three months. The lectures in toxicology and pharmacology are generally required of all pharmacy majors, but the laboratory work in each of these fields is taken only if that field is selected as a minor. Also, a pharmacy student may specialize in pharmaceutical chemistry, pharmacognosy, galenical pharmacy, or another branch of pharmaceutical science, in which case only one other minor is required. The lecture courses for the doctoraal degree are listed in Table II. The student spends three hours per week for two years in the pharmacognosy laboratory. The rest of his time, about seven hours daily (except for lecture hours), is spent in the laboratories of pharmaceutical chemistry, analytical chemistry, and galenical pharmacy, in order to finish the practical exercises within the two years. All pharmacy majors must attend a four-week course (six hours per day) in the local Official Laboratory of the Food Administration. During the third year the student must pass "tentamens" or preliminary examinations in pharmaceutical and analytical chemistry, in pharmacognosy and galenical pharmacy, and in the minor fields. He may then be admitted to the doctoraal examination which is a comprehensive examination in the major and minor fields. The student must also deliver a paper on a special subject. Upon completion of the requirements for the doctoraal degree, he receives the title of "Doctorandus" of Pharmacy. (Research and a thesis would still be required to earn the doctor's degree.)

The last year in the required program of studies in pharmacy is spent in preparation for the apotheker's examination. The student works six hours per day in the laboratory under the supervision of his professor and assistants. The only lectures are on the art of compounding and dispensing for two hours per week and on pharmaceutical literature for one hour per week. There are conferences and discussion groups on drug analysis, the pharmacopeia, pharmaceutical law, and identification of new drugs, and there is a laboratory course in compounding and dispensing for twelve hours per week.

The apotheker's examination may be divided into two parts. At Leiden and Amsterdam, the two parts are joined together as one examination. A few points of the program for this examination may be omitted if the student presents a statement of satisfactory completion of appropriate course work; this differs from one university to another. At Groningen, the first part (chemical and botanical) of the apotheker's examination includes: (1) qualitative analysis of a mixture composed of four or five compounds, inorganic

and organic, (2) quantitative determination of one substance in the above mixture, (3) preparation of an organic medicinal substance or reagent, (4) anatomical description of a pharmacognostic material, (5) a practical exercise in one of the minors (e.g., analysis of a milk product for a person with a minor in food chemistry, determination of vitamin C in blood for a person with a minor in clinical chemistry).

The second part (pharmaceutical) of the apotheker's examination includes: (1) the preparation of a galenical, e.g., an extract or tincture, (2) the quantitative determination of the active constituent in a galenical, tablet or solution, (3) the investigation of an official pharmaceutical material according to the *Pharmacopoeia Nederlandica, Codex Medicamentarum Nederlandicus, British Pharmacopoeia, United States Pharmacopeia, National Formulary,* or *International Pharmacopoeia,* (4) the identification of an unknown medicinal agent, generally to be found in one of the several pharmacopeias, codex, NF, or NNR, (5) the investigation of a mixture of about fifteen minced medicinal herbs, (6) the recognition of medicinal herbs, acquaintance with the plants, plant family, place of origin, main constituents, pharmaceutical preparations, and adulterations, (7) the microscopic identification of a mixture of four powdered pharmacognostic materials, (8) the filling of prescriptions, sterilization, etc., (9) the theory of filling prescriptions, pharmaceutical laws, etc., and (10) the translation of pharmaceutical Latin into Dutch.

After the successful completion of this last examination, the pharmacist is awarded the license to practice his profession and the title of Apotheker.

In conclusion, it should be reported that, as is the case in most of Europe, the only type of retail pharmacy which exists in The Netherlands is what would be called a professional store in the United States.

The finest spiritual culture has come to man through millions of years of education and control on the part of his ancestry, and . . . he will do most for the elevation of the ethics of his profession who will continue that policy in classroom and practice, by word and deed through the years that are allotted to him to set an example to that protoplasmic stream that will continue to flow through the halls of learning.

Rufus A. Lyman, Am. J. Pharm. Ed., **2**, 585 (1938)

PHARMACEUTICAL EDUCATION IN POLAND

WITOLD SASKI AND HENRYK BUKOWIECKI *

From 1918 to 1932, when the secondary education in Poland was reorganized, there were eight-year *gymnasia*, based upon four years of elementary school. There were three types of *gymnasia*: classic (those that included Latin and Greek in their curricula), humanistic (with Latin and modern languages), and mathematico-physical (without Latin but with modern languages). Later, the elementary schools were extended to six years, followed by four years of *gymnasium* and two years of *lyceum*. The programs of the *gymnasia* were standardized and uniform for the whole nation. In the field of sciences, they included mathematics through trigonometry, physics, chemistry, and natural history. *Lycea* were divided into five types: classic, humanistic, mathematico-physical, business administration, and teacher's. The emphasis on specific subject matter depended on the type of *lyceum*. Again, all five types included the uniform standardized central core of subject matter. There were no electives in any of these curricula. However, students could exercise their choice by selection of the type of *lyceum* in which they wished to enroll.

Upon completion of the second year of *lyceum*, a series of rigid written and oral examinations followed, and those successful were awarded the "certificate of maturity," which was basic and mandatory for admission to any of the universities. Persons so qualified were entitled to apply to one of the Faculties of Pharmacy ("Faculty" being a counterpart of an American "College" or "School") for the purpose of taking the entrance examination. Usually there were many more applicants than the number of places available. The examination subjects usually included physics and chemistry. There were five faculties of pharmacy in the universities located in Warsaw, Cracow, Poznan, Wilno, and Lwow. Upon admission, a student was required to follow the standard, uniform, nationwide curriculum which consisted of three full academic years and two trimesters as shown in Table I.

TABLE I

PROGRAM OPERATIVE FROM 1930 TO 1957

First Year of Study

First Trimester	*Number of Clock Hours per Week*	
	Lecture	*Laboratory*
1. Physics	4	0
2. Botany, General	5	6
3. Zoology and Parasitology	2	2
4. Inorganic Chemistry	5	8
5. Mineralogy	2	2
Total 36 hours including	18 lecture and	18 lab. hrs.

* Dr. Saski received his Master of Pharmacy degree from Stefan Batory University, Wilno, Poland, and is now a member of the staff of the University of Nebraska. Dr. Bukowiecki is Associate Dean, Faculty of Pharmacy, Medical Academy of Warsaw, Poland.

TABLE I (Continued)

Second Trimester		
1. Physics	4	0
2. Botany, General	5	6
3. Zoology and Parasitology	2	2
4. Inorganic Chemistry	5	12
5. Mineralogy	2	2
Total 40 hours including	18 lecture and	22 lab. hrs.
Third Trimester		
1. Physics	0	3
2. Botany, Taxonomy	5	6*
3. Anatomy and Physiology	2	2
4. Analytical Chemistry	0	12
5. Organic Chemistry	5	0
6. Mineralogy	2	0
Total 40 hours including	14 lecture and	23 lab. hrs.

* Plus 3 hours per week for field trips.

Second Year of Study

Fourth Trimester	*Number of Clock Hours per Week* *Lecture*	*Laboratory*
1. Analytical Chemistry	0	12
2. Organic Chemistry	5	0
3. Pharmacognosy	3	6
4. Hygiene (Public health)	2	0
5. Biochemistry	2	0
Total 30 hours including	12 lecture and	18 lab. hrs.
Fifth Trimester		
1. Analytical Chemistry	0	12
2. Pharmacognosy	3	6
3. Hygiene (Public Health)	2	0
4. Biochemistry	2	4
5. Microbiology	2	3
6. First Aid	2	0
Total 36 hours including	11 lecture and	25 lab. hrs.

TABLE I (Continued)

Sixth Trimester		
1. Organic Chemistry	0	15
2. Pharmacognosy	3	6
3. Hygiene (Public Health)	0	3
4. Biochemistry	0	4
5. Microbiology	2	3
6. Physical Chemistry	3	0
Total 39 hours including	8 lecture and 31 lab. hrs.	

Third Year of Study

Seventh Trimester		
1. Pharmacognosy	2	4
2. Pharmaceutical Chemistry	4	9
3. Applied Pharmacy	4	12
4. Physical Chemistry	3	3
Total 41 hours including	13 lecture and 28 lab. hrs.	

	Number of Clock Hours per Week	
Eighth Trimester	*Lecture*	*Laboratory*
1. Pharmacognosy	2	4
2. Pharmaceutical Chemistry	4	12
3. Applied Pharmacy	4	12
Total 38 hours including	10 lecture and 28 lab. hrs.	
Ninth Trimester		
1. Pharmacognosy	2	4
2. Pharmaceutical Chemistry	4	12
3. Applied Pharmacy	4	12
4. Cultivation of Medicinal Plants	1	3
5. Pharmaceutical Jurisprudence	1	0
Total 43 hours including	12 lecture and 31 lab. hrs.	

Fourth Year of Study

Tenth Trimester		
1. Technology of Chemical Medicinals	4	12
2. Food Analysis	2	8
3. Toxicologic (Forensic) Chemistry	2	8
4. Pharmacodynamics (Pharmacology)	2	2
5. History of Pharmacy	2	0
Total 42 hours including	12 lecture and 30 lab. hrs.	

TABLE I (Continued)

Eleventh Trimester		
1. Technology of Chemical Medicinals	4	12
2. Food Analysis	2	8
3. Toxicologic (Forensic) Chemistry	2	8
4. Pharmacodynamics (Pharmacology)	2	2
Total 40 hours		
including	10 lecture and 30 lab. hrs.	

The program as presented above laid down the minimum requirements to be met in order to qualify for graduation(1). A Faculty of Pharmacy had the right to increase the number of hours of lecture and/or laboratory work whenever necessary. This was the prerogative of the Faculty Council. The same body could transfer lecture and laboratory work from one trimester to another, but only within the same year of study. Upon the recommendation of the Faculty Council to the Ministry of Education, the Ministry could approve the transfer of a certain subject from one year to another, and, in exceptional cases, could authorize a decrease of the total number of hours in a given subject.

All subjects listed above were required. In addition to these, there were some electives. The Faculty Council determined which electives should be recommended. No electives taken, however, would excuse the student from taking any of the required courses.

Studies and examinations taken at other universities in the country were accepted. The period of study in such cases was reduced accordingly.

Successful completion of the course of study was based upon the passing of the required examinations scheduled at the end of each of the first two years, the so-called "first master's examination" at the end of the third year, and the "second master's examination" at the end of the fourth year.

The "first master's examination" included: pharmacognosy, pharmaceutical chemistry, applied pharmacy, cultivation of medicinal plants, and pharmaceutical jurisprudence. Both theoretical and practical examinations were given in all subjects except the last two listed.

The "second master's examination" included: technology of chemical medicinals, toxicological chemistry, food analysis, and pharmacodynamics.

"Master's examinations" could be taken either in the spring term or in the fall. The grades were as follows: very good, good, sufficient. In cases of a grade of "insufficient," the examination in that particular subject had to be taken again at the next session. Should the student fail to pass it the second time, he had to repeat the whole set of examinations constituting the "master's examination."

Although it was possible to complete the "first master's examination" at the end of the third year, and the "second master's examination" at the end of the fourth year, it was also possible to defer either or both of these examinations for a period of not more than three years after completion of the fourth year of study. A further extension of time, not exceeding two years, could be granted upon a request recommended by the Council of the Faculty to the Ministry of Education. After passing both "master's examinations," the candidate was awarded the degree of Master of Pharmacy (*Magister Farmacji*).

The second higher degree available was that of Doctor of Pharmacy (*Doktor Farmacji*). To qualify for the degree of Doctor of Pharmacy, one would have to complete an experimental research study contributing significantly to science, publish it, and defend it before the Council of the Faculty of Pharmacy in addition to passing examinations in the candidate's major and minor fields. There were no hard and fast rules with respect to extra course work to be taken prior to these examinations and the publication of the thesis. The type of research and the advice of the major professor were the determining factors in this respect. The standards were rather high, as was shown by the fact that in the last ten years before the war there were only thirty doctorates awarded in the whole country.

World War II brought upon Poland incredible devastation. The losses incurred were both material and cultural. The second oldest university in Central Europe, the Jagiellonian University in Cracow, suffered perhaps the most. As early as November 6, 1939, 183 scientists, professors, and research associates were arrested and deported to the concentration camp in Sachsenhausen where, subsequently, twenty-five of them died. The University of Poznan lost many professors who were executed at Fort VII, and many were lost in camps at Dachau, Gusen, and Mauthausen.

Most of the University campus in Warsaw burned to the ground in 1939. Only the main library and a few buildings in its proximity were saved. In line with the occupant's policy, the University equipment, whatever was left of it, was shipped to Germany and all the institutions of higher learning liquidated. Despite strict orders prohibiting any attempt to continue any education at the secondary and university levels, clandestine teaching started in February, 1940, and in Warsaw alone there were about 2,000 University students attending small classes, usually of less than ten persons, purposely kept small to avoid detection. In the underground university in Warsaw the following faculties were active: Catholic theology, Protestant theology, law, medicine, the humanities, the natural sciences, and pharmacy.

The Faculty of Pharmacy at the University of Warsaw started its activity at the beginning of the academic year of 1941-42. That indomitable professor, Bronislaw Koskowski, although advanced in years, served as the Dean of the Faculty. Almost the whole staff of the prewar days served as instructors. Practical work was conducted in the laboratories of private pharmacies and in pharmaceutical manufacturing plants. For the academic year of 1943-44, there were 215 students on the roster. Thirty-nine graduated that year.

Of the Faculty's teaching personnel, nine persons lost their lives during the war. (In all, there were 191 of the teaching personnel in the whole University of Warsaw who lost their lives during World War II.) The underground Faculty of Pharmacy of the University of Poznan operated in a similar fashion.

The famous Warsaw Uprising of 1944, which lasted for two months, brought upon that city ultimate destruction. Practically all the remaining University buildings were burned and ruined. Most of the private collections of books of the teachers as well as manuscripts awaiting publication were burned. About 300 University students were killed during the action. The next year saw the victory of the Allied Forces over Nazi Germany.

There was little delay in the resumption of academic activity everywhere in Poland. In the beginning of 1945, the Faculty of Pharmacy of the Uni-

versity of Warsaw organized their temporary quarters in the empty stables of the Faculty of Veterinary Medicine.

In the city of Lublin a new university was organized, and the Faculty of Pharmacy came into being there January 6, 1945. Subsequently, the faculties in the Universities of Cracow and Poznan were reactivated. In the industrial city of Lodz, formerly having no institution of higher learning of its own, a new university which included a Faculty of Pharmacy was organized. In the city of Wroclaw (Breslau), the School of Pharmacy was established as a part of the Faculty of Medicine in 1946, and the seventh and last Faculty of Pharmacy was created in the Medical Academy in Gdansk (Danzig), shortly thereafter.

In 1947, the Ministry of Education published a report under the editorship of Dr. Marian Falski "On the State of the Institutions of Higher Learning in Poland in 1945-46," from which we quote the following:

> We lost two great centers of higher education, Lwow and Wilno, located in territories presently separated from Poland, where, before the war, over 25 per cent of the total number of University students of the whole country were enrolled. These are replaced by new centers of higher education both in the old Polish territory . . . and in the newly added lands . . . where Poland inherited the premises and physical plants of former German institutions as in Wroclaw (Breslau) and Gdansk (Danzig), although there were considerably devastated.

As far as pharmacy is concerned, the loss of the city of Lwow and that of Wilno meant, of course, the loss of the School of Pharmacy at Jan Kazimierz University and at Stefan Batory University, respectively.

Primary and secondary education have been gradually reorganized. In the fall of 1948, a new eleven-year school was introduced replacing the old, six-four-two, sequence of a primary school, *gymnasium*, and *lyceum*. This meant shortening of the period of schooling prior to the "certificate of maturity" examination by one year (2). This system is new to Polish education and was introduced as a result of the Soviet Union's influence. The extension of this period of schooling back to twelve years is now under consideration.

Since January, 1950, the faculties of pharmacy and faculties of medicine, in all seven universities, have been separated from the universities and have become "medical academies." Of ten existing medical academies in Poland today, there are seven which have a Faculty of Pharmacy.

In 1948, the so-called "ideological subjects" were introduced into the program of instruction in pharmacy and medicine. At first, the number of clock hours for these subjects (philosophy of Marxism and Leninism, political economy, etc.) amounted to 128 in addition to 4,250 clock hours of instruction as shown in Table I. In 1950, the number of clock hours devoted to these subjects was increased further and amounted to 360. This state of affairs persisted until October, 1956, when these subjects were eliminated.

A great reform came in 1957 (3, 4). That year the course of study in pharmacy was extended to five years (ten semesters), the fifth year being devoted to specialization in one of the following fields:

1. retail and hospital pharmacy,
2. industrial pharmaceutical technology,
3. drug, food, forensic and clinical analysis,
4. cultivation of medicinal plants.

The course of study ends with the thesis based upon experimental research. The degree awarded upon the completion of the course of study will be the same as before, the Master of Pharmacy.

The detailed curriculum is shown in Table II.

TABLE II

PROGRAM INITIATED IN THE FALL 1957

	Clock Hours		*First Semester (15 Weeks)*	*Second Semester (15 Weeks)*
	Lectures	*Laboratory*	(Numerator indicates the number of lecture and the denominator the number of laboratory hours)	
First Year				
Parasitology with Elements of Zoology	30	15	2/1	
Physics	120	75	5/3	3/2
Inorganic Chemistry	120	45	5/0	3/3
Calculus	60	30	2/1	2/1
Latin		60	0/2	0/2
Modern Foreign Language (Choice: Russian, German, French, or English)		60	0/2	0/2
Pharmaceutical Botany	75	45		5/3
Second Year				
Pharmaceutical Botany	60	90	2/3	2/3
Modern Foreign Language		60	0/2	0/2
Inorganic Analytical Chemistry	30	360	1/12	1/12
Organic Chemistry	135		5/0	4/0
Hygiene (Public Health)	45	30	3/2	
Human Physiology with Anatomy	75		3/0	2/0
History of Pharmacy	30			2/0
Third Year				
Organic Chemistry		225	0/15	
Organic Analytical Chem.	30	60	2/4	
Physical Chemistry and Colloid Science	60	60		4/4
Microbiology	60	60	2/0	2/4
Pharmacognosy	90	240	3/8	3/8
Chemistry of Drugs	150	120	5/0	5/8

TABLE II (Continued)

Fourth Year				
Chemistry of Drugs		120	0/8	
Applied Pharmacy	90	240	3/8	3/8
Technology of Drugs (Industrial Engineering and Design)	120	150	4/5	4/5
Toxicologic Chemistry	30	45	2/3	
Food Analysis	45	60		3/4
Human Pathology	30		2/0	
Biochemistry	45	60		3/4
Pharmaceutical Jurisprudence		30		2/0
Fifth Year				
Pharmacodynamics	75	75	3/3	2/2
Special subjects related to master's thesis in one of the four fields in Table III.	150-240	165-255		
Master's Thesis		375		0/25

The complete program for the fifth year is now under consideration, and, after agreement is reached, by the representatives of the seven medical academies and governmental agencies involved, a uniform program will be adopted.

However, the draft proposal of the Faculty of Pharmacy of the Medical Academy of Warsaw is shown in Table III.

TABLE III

SPECIAL SUBJECTS TO BE TAKEN THE FIFTH PROFESSIONAL YEAR

(A) Students Majoring in Retail and Hospital Pharmacy

	Clock Hours	
	Lecture	*Laboratory*
1) Applied Pharmacy, selected topics (the application of physical laws and principles to certain pharmaceutical systems, formulations, small scale manufacturing)	45	120
2) Technology of Galenical Pharmacy	30	45
3) Cultivation of Medical Plants	45	45
4) Clinical Analysis	30	45
Total	150	255

(B) Students Majoring in Industrial Pharmaceutical Technology

	Clock Hours	
	Lecture	*Laboratory*
1) Technology of Inorganic Drugs	30	0
2) Technology of Organic Drugs	45	0
3) Selected Topics on Industrial Technology	30	30
4) Technology of Antibiotics and Hormones	30	30
5) Technology of Galenical Pharmacy	30	45
6) Elements of Chemical Engineering	45	30
7) Industrial Design	15	45
Total	225	180

TABLE III (Continued)

(C) Students Majoring in Drug, Food, Forensic and Clinical Analysis

	Clock Hours	
	Lecture	*Laboratory*
1) Microchemistry	30	30
2) Methods in Instrumental Analysis	30	45
3) Clinical Analysis	30	45
4) Food Analysis	45	60
5) Toxicologic (Forensic) Chemistry	0	60
6) Statistical Analysis	30	0
Total	165	240

(D) Students Majoring in Cultivation of Medicinal Plants

	Clock Hours	
	Lecture	*Laboratory*
1) Soil Management	60	30
2) Cultivation of Medicinal Plants	60	60
3) Phytochemistry	60	30
4) Methods in Instrumental Analysis	30	45
5) Statistical Analysis	30	0
Total	240	165

This plan shall become operative in 1958-59, and will apply to those students who in the current academic year (1957-58) will complete their fourth year. In other words, the plan becomes operative immediately and is not limited to new students enrolling as freshmen in 1957-58.

After completion of the fourth year of study, the student is required to serve one month of internship in a retail pharmacy regardless of the kind of specialization he selects for the fifth and final year of study.

The tenth and last semester is devoted to work on the master's thesis. It has a special value to those intending to pusue further studies leading to higher scientific degrees. Nevertheless, it will be useful to others because it will familiarize them with the elements of creative scientific work and methods, draw attention to the necessity of consulting foreign literature, and stimulate interest in new achievements of science.

The number of hours devoted to physiology (with human anatomy) and pharmacodynamics (pharmacology) has been increased considerably. In addition, a new subject, that of human pathology, was introduced. This should be helpful to a better understanding of the nature of the diseases which are treated with chemotherapeutic agents. Pharmacodynamics is offered in the fifth and last year. In line with trends of this nuclear era, the number of hours in physics has been nearly doubled (120 lecture and 75 hours of laboratory work).

More attention has been given to chemistry. Inorganic chemistry ends with the first year, and the laboratory work includes mostly syntheses of preparations. Inorganic analytical chemistry has been reorganized as a separate subject and offered in the second year, with the main emphasis placed upon laboratory work. Lectures in organic chemistry are given in

the second year, but the laboratory work in organic synthesis is taken in the fifth semester. Additionally, organic analytical chemistry has been introduced in the third year, since this subject is indispensable to every modern analyst. In the sixth semester, physical chemistry and colloid science follow.

The lectures in pharmaceutical chemistry, now named chemistry of drugs, are given in the third year, and the laboratory work is performed in the sixth and seventh semesters.

To understand modern physical chemistry fully, it is necessary to become versed in elementary calculus. Therefore, two semesters of calculus are now required in the first year. In the fifth year, statistical analysis has been introduced and is required of all students majoring either in pharmaceutical analysis or cultivation of medicinal plants. Microbiology will be taught after the organic chemistry is completed; that is, in the third year rather than in the second, as before.

In lectures on hygiene (public health), the principles of nutrition and hygiene of environment will be stressed. In the laboratory, the student will familiarize himself with the chemical and bacteriological analysis of water and air.

Pharmaceutical botany is extended over a period of two years with the idea that the student should have the opportunity of participating in field trips and with the further advantage that there should not be a long interval between pharmaceutical botany and pharmacognosy. Traditionally, pharmacognosy has been given a very prominent place in pharmaceutical curriculum in Poland, and, although the number of hours of this discipline dropped from 450 to 330 clock hours of instruction, this still is rather substantial (three clock hours of lectures and eight clock hours of laboratory work a week) over a period of two semesters of the third year.

The subject that in Poland is regarded as the most important one in the entire curriculum is pharmacy proper, or, as it is called there, "applied pharmacy" (4). Appropriately enough, it begins in the fourth year of study, that is to say, after all the basic sciences on which applied pharmacy is built have been mastered. This approach quite obviously is sound since it eliminates the necessity of studying these basic sciences under the heading "pharmacy" or "principles and processes of pharmacy" and allows full utilization of the time allotted to the application of inorganic, organic, physical, and colloidal chemistry, and physics, as well as chemistry of drugs, to pharmaceutical technology and dispensing. The basic elements of pharmaceutical technology are given at that time over the period of two semesters (three clock hours of lecture and eight clock hours of laboratory work). The advanced work will be performed in the fifth year when, for those majoring in retail and hospital pharmacy and in industrial pharmaceutical technology, parenteral preparations, and the technology of other pharmaceutical products, including new product development, will be studied. The evaluation of the products so manufactured follows, by means of chemical, physical, and, whenever necessary, biological assays.

Food analysis traditionally has been regarded in Poland as falling within the domain of the pharmacist. In fact, over the period of the last forty years, the Polish pharmacist has proved that in so far as the control of food is concerned, he has possessed the highest qualifications when compared with any other experts in this field. This fact has been reflected in the

retention of the subject of food analysis as a required course in the general curriculum (105 clock hours are offered in the eighth semester, 45 hours lectures and 60 hours of laboratory work). In addition, students majoring in pharmaceutical analysis will be taking 105 additional clock hours in this same subject.

Another field of analysis where the pharmacist's background fits him for a position as analyst particularly well has long been the field of forensic chemistry. Again, experience has shown that, for instance, the Institute of Forensic Medicine in Warsaw before World War II was manned largely by pharmacists.

With respect to languages it has been decided that Latin will be required only of those students who have not had it prior to admission to the university. However, one modern foreign language is required, regardless of whether or not the student has had any previous training in it. There is a choice of language offered, and this includes Russian, German, French, or English. It has been felt that knowledge of at least one foreign language is mandatory.

By the act of legislature (Sejm) of December, 1951, the degree of Doctor of Pharmacy was discontinued and replaced by a new one, that of "Candidate of Pharmaceutical Sciences." The next higher degree (and the highest obtainable) established by this act is that of "Doctor of Pharmaceutical Sciences."

The act established corresponding degrees in other fields of scientific endeavor too; that is, in the following sciences: biology, chemistry, economics, philosophy, physics, geography, geology, history, mathematics, medicine, forestry, pedagogics, law, psychology, agriculture, fine arts, engineering, and veterinary medicine. (5).

To qualify for the degree of "Candidate" in any of these fields, one must have obtained the degree of "Master" and subsequently have passed the required examinations and presented his thesis, which must be accepted as an original contribution to the given field of science.

The thesis itself has to be publicly discussed and defended. The examinations include: (1) basic subjects in the given field of science, (2) special subjects in the area covered by the thesis.

The major professor submits the thesis to the respective Faculty Council with the recommendation that at least two referees, who are scientists, be appointed. The Faculty Council accepts or rejects the thesis by simple majority. If the thesis is accepted, the Faculty Council announces the public examination in the local press at least ten days prior to the date.

Opinions of the referees are handed to the applicant at least thirty days prior to the public examination in order to make it possible for him to make suitable preparation. The public defense of the thesis takes place before the Faculty Council. After the defense is over, the Council immediately proceeds with an executive session to determine whether the degree of the candidate should be conferred. This is decided upon by a secret ballot following the discussion by a simple majority of the votes, provided at least two-thirds of the members of the Council are present. In the case of an adverse decision of the Council, the applicant may appeal to the Central Qualifying Committee for Scientific Workers.

The highest degree, that of "Doctor of (respective) Sciences," may be awarded to the "Candidate of (respective) Sciences" who submits a doctor's thesis approved by the Faculty Council and defends it publicly.

Quoting from the Act of 1951, *verbatim*, "The Doctor's thesis is supposed to represent a creative contribution to the development of a given branch of science; it should represent an independent piece of research, as a result of which either a solution or theoretical generalization of a serious scientific problem has been accomplished."

Original contributions including theses are published in the prewar scientific journal *Acta Poloniae Pharmaceutica* (bimonthly) which reappeared in 1947 and has been continued ever since. Another pharmaceutical scientific journal is *Dissertationes Pharmaceuticae* (quarterly). It has been published regularly since 1949. The most widely read journal is *Farmacja Polska* (monthly), which publishes not only original scientific contributions but also review articles and papers discussing all possible aspects of professional pharmacy of current interest.

Before World War II the number of students enrolled in pharmacy amounted to about 1,300, and the number graduating annually was about 200. In the decade from 1944 to 1954, the number of those enrolled averaged about 2,500, and there were about 450 graduates per year (6).

Despite this increased output of pharmacists, their number was still insufficient to meet the demands of the profession. As a result of losses occurring during World War II, about 1,000 pharmacists have simply disappeared. The need for replacement has been acute. In addition to retail outlets, the pharmaceutical industry, hospitals, analytical laboratories, the herb industry, etc. were seeking qualified men to fill their vacancies. In parliamentary discussions it has been pointed out (7) that unsatisfactory financial rewards in the profession have served as a deterrent to many potential students of pharmacy. It has been further indicated that, to make matters worse, there has been a great preponderance of women students in pharmacy, amounting at times to 85 to 90 per cent of the total student body. What happens next is not difficult to foresee. Many of them marry and either never practice the profession or leave it very soon. The problem of insufficient supply of fully qualified manpower has led to an attempt to solve it by the creation, a few years ago, of "pharmaceutical *lycea*," which are producing technicians enjoying limited, but possibly still too great, responsibilities in pharmacy. This type of personnel with limited qualifications has been long in existence in Russia. Undoubtedly, in the vast territories of the USSR, the rational distribution of prepackaged drugs calls for a dispenser with less than full professional background. How it will work in Poland remains to be seen.

Because of the marked dissimilarities in the elementary and secondary educational programs, as well as in the pharmaceutical curricula themselves, in the United States and in Poland, a direct comparison of the two programs is extremely difficult. There are, however, a few general observations which can be made.

1. Preparation for the study of pharmacy.

For many years, the preparation and standards required for admission to a university in Poland have been considered to be considerably higher than those required for admission to universities in the United States. This is

possible because of the uniform, nationwide pattern, and the nature of the subject matter required in the programs of the schools on the secondary level. Under this program, it is impossible for any student to evade such fundamental courses as mathematics, science, and foreign languages. Moreover, only those students who exhibit sufficiently high proficiency to qualify for the "certificate of maturity" are admitted to the entrance examinations of the universities, and here again a further screening occurs.

2. Scope of the programs.

It is quite evident that the program leading to the Master of Pharmacy degree in Poland combines the elements of both the undergraduate and the graduate degree programs. In this respect, it differs materially from the program in pharmacy leading to the Bachelor of Science degree offered in this country. The Doctor of Pharmacy degree, replaced by the degrees of Candidate of Pharmaceutical Sciences and Doctor of Pharmaceutical Sciences, has always been a research degree.

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One thing the Editor is sure of and that is, until American Pharmacy is organized along more democratic lines than it now is, we must do nothing that will hinder us in any way of speaking our minds as to what is right and wrong in all the problems that confront pharmaceutical education and legislation.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 212 (1937)

PHARMACEUTICAL EDUCATION IN CENTRAL AND SOUTH AMERICA*

ARTHUR E. JAMES

For a part of the program dealing with pharmaceutical education of the Fourth Pan-American Congress of Pharmacy and Biochemistry it seemed pertinent that an attempt be made to survey current patterns of pharmacy instruction in Central and South America. In the pursuit of this project it became evident why this Pan-American Congress carries the name of "Pharmacy and Biochemistry." Not only are pharmacy and biochemistry closely associated in many institutions but the very degree offered upon completion of the pharmacy course is frequently designated as one in pharmacy and biochemistry. Likewise the close association between dentistry and pharmacy in many of these schools and colleges is noteworthy.

During the summer of 1957, a questionnaire was sent to fifty-seven institutions in Central and South America which were known to offer instruction in pharmacy. This list was obtained from a compilation of the "Schools and Colleges of Pharmacy in the Americas Outside the U.S.A." This list had been compiled by George B. Griffinhagen, Executive Secretary of the Fourth Pan-American Congress of Pharmacy and Biochemistry.

Notwithstanding limitations imposed by language differences, distances, and time, most of the schools made a prompt and friendly response. This response is deeply appreciated and has given the project a sense of enthusiastic endorsement.

In order to expedite time and to promote clarity in presentation, the data obtained from the questionnaires have been condensed into tabular form. Figure 1 shows the geographical locations of the schools and colleges in Central and South America in which courses in pharmacy are offered. Not including Mexico, Central and South America have a population of approximately 154 million people. Of this total about two-thirds live in South America. The proximity of many of the most populous regions to the ocean is noteworthy, while all but two of the South American countries, the inland republics of Bolivia and Paraguay, have extensive ocean coast lines. With the exception of Portuguese in Brazil, and French in Haiti, the pharmacy instruction is offered in the Spanish language.

(Tabulated data about schools appears following Figure 1.)

* Presented to the Section on Education of the Fourth Pan-American Congress of Pharmacy and Biochemistry, Washington, D.C., 1957.

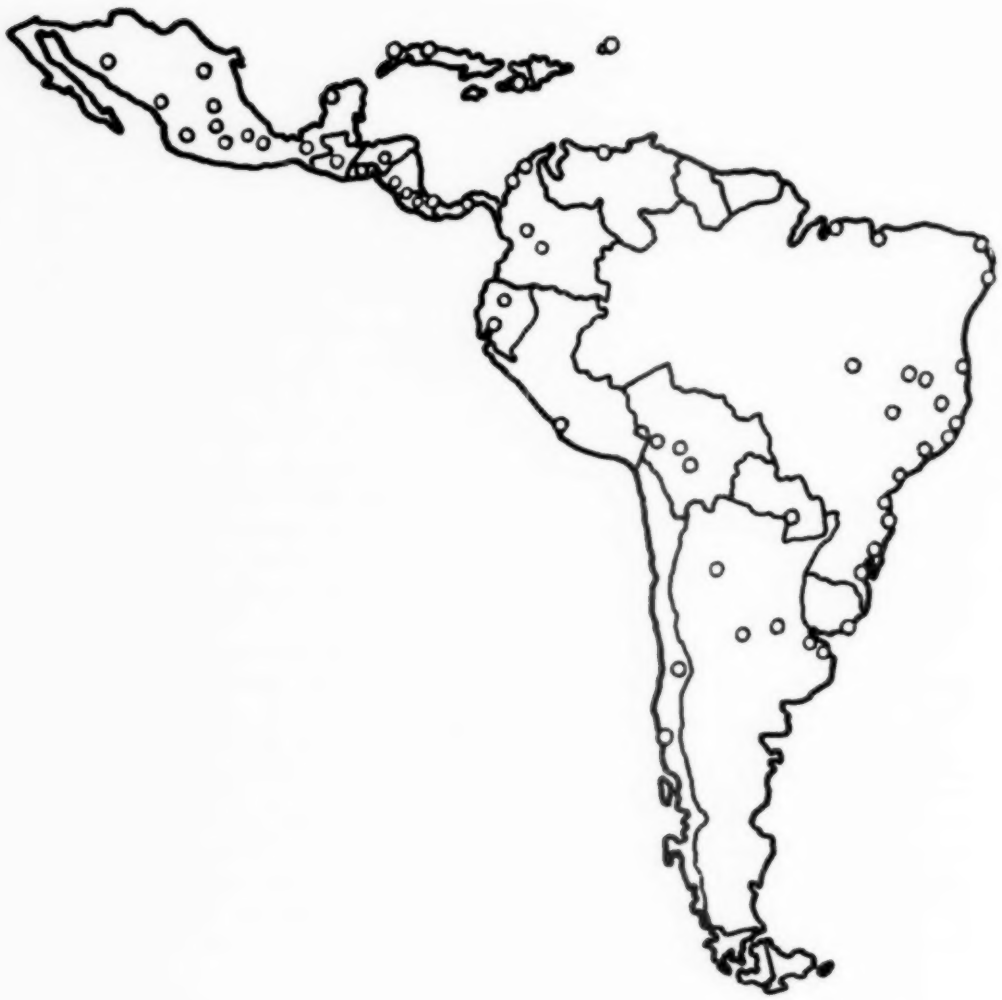

FIG. 1. LOCATIONS OF SCHOOLS OF PHARMACY IN CENTRAL AND SOUTH AMERICA

PHARMACEUTICAL EDUCATION IN ARGENTINA

Pop. 16,104,000—15% of S.A.	Area, 1,079,965 Sq. Mi.—16% of S.A.
Five Schools of Pharmacy	Instruction in Castilian Spanish
	Faculty of Chemistry and Pharmacy, La Plata National University, La Plata
El. and Sec. Educ.	11 Years
Pharmacy	4 Years
Title	Pharmacist
Practical Experience Required	1 Year
Enrollment	856 (Total) 453 M., 412 W.
Graduates at Last Graduation	31 (Total) 15 M., 16 W.
Administration	Public

Other Schools of Pharmacy in Argentina

Schools	*Length of Pharmacy Course*	*Degree or Title*
School of Pharmacy and Biochemistry, National University of Buenos Aires, Rosario	4 Years	Doctor of Pharmacy
Department of Biochemistry and Pharmacy, National University of Cordoba	6 Years	Doctor of Biochemistry and Pharmacy
School of Pharmacy, National University of the Littoral, Rosario	4 Years	Doctor of Biochemistry and Pharmacy
Faculty of Biochemistry, Chemistry and Pharmacy Tucuman	4 Years	Doctor of Biochemistry and Pharmacy

PHARMACEUTICAL EDUCATION IN BOLIVIA

Pop.—3,722,000—3.5% of S.A.	Area—513,068 Sq. Mi.—7.5% of S.A.
Three Pharmacy Schools	Instruction in Spanish
	School of Chemistry and Pharmacy University of Saint Simon, Cochabama
El. and Sec. Educ.	12 Years
Pharmacy Course	4 Years
Title	Licentiate In Pharmacy and Biochemistry
Enrollment	40 M., 80 W.
Graduates at Last Graduation	2 M., 3 W.
Practical Experience Required	400 Hours

Other Schools

Pharmacy and Biochemistry, University of Saint Andres, La Paz
(5 Year Course)

Pharmacy, University of Saint Francis Xavier, Sucre (4 Year Course)

PHARMACEUTICAL EDUCATION IN BRAZIL

Pop.—57,226,000—51% of S.A. Area—3,268,169 Sq. Mi.—49% of S.A.
Twenty-one Pharmacy Schools Instruction Mostly in Portuguese

	School of Pharmacy and Dentistry of Natal Rio Grande Do Norte	School of Dentistry and Pharmacy, University of Minas Gerias
El. and Sec. Educ.	12 Years	12 Years
Pharmacy	4 Years	4 Years
Title	Pharmacist	Pharmaceutical Chemist
Enrollment	21 M., 12 W.	60
Graduates at Last Graduation	3 M., 3 W.	13 M., 10 W.
Administration	Public	Public

Other Schools of Pharmacy and Dentistry

Alfenas, Alfenas, Minas Gerias
Pelotas, Rio Grande do Sul
University of Sao Paulo, Sao Paulo
Araraquara, Araraquara
Gois, Goiania

	School of Pharmacy University of Bahia Salvador, Bahia	School of Pharmacy and Dentistry, Santo Maria Florionpolis
El. and Sec. Educ.	12 Years	11 Years
Pharmacy	4 Years	3 Years
Title	Pharmaceutical Chemist	Pharmaceutical Chemist
Enrollment	36 M., 27 W.	53 M., 10 W.
Last Graduation	28	12 M., 6 W.
Administration	Public	Private

Other Schools of Pharmacy

University of Brazil, Rio de Janerio
Vitoria, Espirito Santo
Ouro Preto, Minas Cerias

	Faculty of Pharmacy and Dentistry, University of Ceara, Fortaleza	School of Pharmacy and Dentistry of Riberirao Preto, Rio Preto
Enrollment	100 M., 40 W.	
Graduates at Last Graduation	13 M., 5 W.	30 M., 24 W.
Title	Pharmacist	Pharmacist
Pharmacy Course	3 Years	3 Years

Some Other Schools of Pharmacy and Dentistry

Sao Luiz do Maranhao, Sao Luiz
Curitiba, Parna
Rural University, Belem, Para
Juiz de Fora
The Paula Ramos Foundation, Sao Luiz
Santo Catarina, Santo Catarina

Most of the Pharmacy Schools Have a Three-Year Curriculum

PHARMACEUTICAL EDUCATION IN CHILE

Pop.—5,237,000—5% of S.A. Area—286,396 Sq. Mi.—4.2% of S.A.
Two Schools of Pharmacy Instruction in Spanish

	School of Chemistry and Pharmacy, University of Conception, Conception	School of Chemistry and Pharmacy, University of Chile, Santiago
El. and Sec. Educ.	12 Years	12 Years
Pharmacy Course	5 Years	5 Years
Practical Experience	½ Year	½ Year
Title or Degree	Pharmaceutical Chemist	Pharmaceutical Chemist
Enrollment	171 (Total) 81 M., 90 W.	327(Total)143 M., 184 W.
Graduates at Last Graduation	22 (Total) 10 M., 12 W.	53 (Total) 31 M., 22 W.
Curriculum Increased in Length	1945	1947
Administration	Private	State

PHARMACEUTIAL EDUCATION IN COLOMBIA

Pop.—9,905,000—9.3% of S.A. Area—439,825 Sq. Mi.—6.59% of S.A.
Four Pharmacy Schools Instruction in Spanish

	School of Chemistry and Pharmacy, University of Atlantic, Barranquilla	School of Pharmacy, National University of Colombia, Bogota	School of Chemistry and Pharmacy, University of Cartagena, Cartagena
El. and Sec. Educ.	11 Years	11 Years	11 Years
Pharmacy Course	4 Years*	4 Years	4 Years
Title	Pharmaceutical Chemist	Same	Same
Enrollment	86 M., 17 W.	44 M., 55 W.	43 M., 5 W.
Graduated at Last Graduation	9 M.	7 M., 4 W.	10 M.
Administration	Public	Public	Public

* Length of Course To Be Increased in 1958. This School Requires 720 Hours of Practical Experience.

Other School of Pharmacy

University of Antioquia, Medellin

PHARMACEUTICAL EDUCATION IN ECUADOR

Pop.—3,171,000—3% of S.A.	Area—104,510 Sq. Mi.—1.5 % of S.A.
Two Pharmacy Schools	Instruction in Spanish
	School of Engineering, Chemistry and Pharmacy, Central University, Quito
El. and Sec. Educ.	12 Years
Pharmacy Course	5 Years
Degree	Doctor of Biochemistry and Pharmacy
Enrollment	49 M., 69 W.
Graduated at Last Graduation	9 M., 11 W.
Administration	Autonomous

Other School

School of Chemistry and Pharmacy, University of Guayaquil

PHARMACEUTICAL EDUCATION IN PARAGUAY

Pop. 1,405,000—1.3% of S.A.	Area—157,000 Sq. Mi.—2.3% of S.A.
One Pharmacy School	Instruction in Spanish
	School of Chemistry and Pharmacy National University of Paraguay, Asuncion
El. and Sec. Educ.	12 Years
Pharmacy Course	4 Years
Degree or Title	Doctor of Pharmacy
Enrollment	About 100
Administration	Public

PHARMACEUTICAL EDUCATION IN PERU

Pop.—7,023,000—7% of S.A.	Area—482,257 Sq. Mi.—6.6% of S.A.
Two Schools of Pharmacy	Instruction in Castilian Spanish
	School of Pharmacy and Biochemistry National University of San Marcos, Lima
El. and Sec. Educ.	10 Years
Pharmacy Curriculum	1 Year Prepharmacy
	4 Years of Pharmacy
Degree	Bachelor of Pharmacy
Title	Pharmaceutical Chemist
Enrollment	174 M., 373 W.
Graduates at Last Graduation	33 M., 80 W.
Administration	Autonomous

Other School of Pharmacy

School of Pharmacy and Biochemistry, University of Trujillo, Lima

PHARMACEUTICAL EDUCATION IN URUGUAY

Pop.—2,650,000—2.5% of S.A.	Area—72,172 Sq. Mi.—1.1% of S.A.
One School of Pharmacy	Instruction in Spanish
	School of Chemistry and Pharmacy
	University of the Republic, Montevideo
El. and Sec. Educ.	12 Years
Pharmacy Course	5 Years
Degree or Title	Pharmaceutical Chemist
Enrollment	382 M., 597 W.
Graduates at Last Graduation	8 M., 7 W.
Administration	Public

PHARMACEUTICAL EDUCATION IN VENEZUELA

Pop.—4,986,000—4.7% of S.A. Area—352,141 Sq. Mi.—5.2% of S.A.
Four Pharmacy Schools Instruction in Spanish

	School of Pharmacy University of the Andes, Merida	School of Pharmacy Central University of Venezuela, Caracas
El. and Sec. Educ.	11 Years	11 Years
Pharmacy Course	5 Years	5 Years
Title or Degree	Pharmacist	Pharmacist
Enrollment	79 M., 112 W.	92 M., 211 W.
Graduated at Last Graduation	15 M., 8 W.	12 M., 14 W.

Other Schools of Pharmacy

Catholic University "Andres Bello"
University "Santa Maria," Caracas

PHARMACEUTICAL EDUCATION IN COSTA RICA

Pop.—801,000	Area—19,283 Square Miles
One Pharmacy School	Instruction in Spanish
	School of Pharmacy
	University of Costa Rica, San Jose
El. and Sec. Educ.	11 Years
Pharmacy Course	5 Years
Degree or Title	Licensed Pharmacist
Practical Experience Required	600 Hours Before Entering 5th Year
	600 Hours During 5th Year
Enrollment	65 M., 39 W.
Graduates at Last Graduation	4 M., 3 W.
Administration	Public

Course Increased in Length in 1950

PHARMACEUTICAL EDUCATION IN EL SALVADOR

Pop.—1,859,000	Area—42,044 Sq. Mi.
One Pharmacy School	Instruction in Spanish
	School of Chemistry and Pharmacy
	University of El Salvador, San Salvador
El. and Sec. Educ.	11 years
Pharmacy Course	5 years
Title	Doctor
Enrollment	40 M., 38 W.
Graduates at Last Graduation	2 M., 2 W.
Administration	Public (State)

PHARMACEUTICAL EDUCATION IN GUATEMALA

Pop.—2,787,000	Area—42,044 Sq. Mi.
	Instruction in Spanish
	School of Pharmacy,
	San Carlos University of Guatemala
	Guatemala
El. and Sec. Educ.	11 Years
Pharmacy Course	6 Years
Title or Degree	Pharmaceutical Chemist
Practical Experience Required	2 Years
Enrollment	100 M., 116 W.
Graduated at Last Graduation	11 M., 4 W.
Administration	Public (Autonomous)

PHARMACEUTICAL EDUCATION IN HONDURAS

Pop.—1,201,000	Area—56,160 Sq. Mi.
	Instruction in Spanish
	School of Chemistry and Pharmacy
	University of Honduras, Tegucigalpa
El. and Sec. Educ.	11 Years
Pharmacy Course	5 Years
Title or Degree	Doctor of Chemistry and Pharmacy
Practical Experience	3 Years
Enrollment	40 M., 45 W.
Graduates at Last Graduation	9 M., 3 W.
Administration	Public (State)

PHARMACEUTICAL EDUCATION IN NICARAGUA

Pop.—1,049,000 Area—57,153 Sq. Mi.
Three Pharmacy Schools Instruction in Spanish

School of Pharmacy, National University of Nicaragua, Leon
School of Pharmacy, University de Oriente y Mediodia, Granada
School of Pharmacy, Central University, Managua

The pharmacy course is usually 5 years in length leading to the doctor of pharmacy degree.

PHARMACEUTICAL EDUCATION IN PANAMA

Pop.—801,000	Area—28,576 Sq. Mi.
One School of Pharmacy	Instruction in Spanish
	School of Pharmacy
	University of Panama, Panama City
El. and Sec. Educ.	12 Years
Pharmacy Course	4 Years
Title or Degree	Licensed Pharmacist
Enrollment	53 M., 27 W.
Graduated at Last Graduation	5 M., 3 W.
Administration	Autonomous

The course is now operated in the evening.
It is planned to operate in the daytime in the near future.

PHARMACEUTICAL EDUCATION IN CUBA

Pop.—4,228,000	Area—44,164 Sq. Mi.	
Three Pharmacy Schools	Instruction in Spanish	
	School of Pharmacy University of Habana Habana	School of Pharmacy University of Villanueva Habana
El. and Sec. Educ.	12 Years	12 Years
Pharmacy Course	5 Years	5 Years
Title or Degree	Doctor of Pharmacy	Doctor of Pharmacy
Enrollment	100 M., 900 W.	8 M., 46 W.
Graduated at Last Graduation	15 M., 63 W.	1 M., 1 W.
Administration	Autonomous	Private

Other Schools

School of Pharmacy, National University of Jose Marti, Vedado, Habana

PHARAMACEUTICAL EDUCATION IN THE DOMINICAN REPUBLIC

Pop.—2,121,000	Area—19,129 Sq. Mi.
One Pharmacy School	Instruction in Spanish

School of Pharmacy and Chemistry, University of Santo Domingo, Trujillo
A Four Year Course in Pharmacy

PHARMACEUTICAL EDUCATION IN PUERTO RICO

Pop.—2,264,000	Area—3,600 Sq. Mi.
One School of Pharmacy	Instruction in Spanish
	College of Pharmacy
	University of Puerto Rico, San Juan
El. and Sec. Educ.	12 Years
Pharmacy Course	5 Years*
Title	B.S. in Pharmacy
Enrollment	185 of whom 50% are women
Administration	Public

**Since 1949. From 1928-1949 it was a four year course. This college of pharmacy was recognized by the American Association of Colleges of Pharmacy in 1932 and by the Department of Education of the State of New York in 1950. The American Council on Pharmaceutical Education graded it as an "A" college in 1951.*

PHARMACEUTICAL EDUCATION IN HAITI

Pop.—3,112,000	Area—10,850 Sq. Mi.
One School of Pharmacy	Instruction in French
	School of Medicine and Pharmacy, Republic of Haiti, Port-au-Prince
El. and Sec. Educ.	12 Years
Pharmacy Course	4 Years*
Title or Degree	Pharmacist
Practical Experience Required	200 Hours
Enrollment	12 M., 17 W.
Graduated in 1957	2 M., 4 W.
Administration	Public

**Soon to be five years.*

From the data presented it is evident that the large majority of pharmacy schools require for admission a total of twelve hours of elementary and secondary education. Likewise, the growing number of institutions which operate a five year program in pharmacy should be of particular interest to the American Association of Colleges of Pharmacy. In some of these five year programs conducted by our southern neighbors is found material which may be designated as "general education." Their program of studies sometimes includes such subjects as mineralogy, bromatology (science of foods), and toxicology. Several of the schools which now have a five year course have inaugurated this program in recent years. Other schools indicated that they have under consideration an extension of their four year program.

A significant aspect of pharmaceutical education in Central and South America, which differs from the pattern in the United States, is that the conferring of the pharmaceutical degree entitles the recipient to practice pharmacy without further examination. Essentially this is the equivalent to licensure by the Boards of Pharmacy in the United States. Thus it is evident why these southern schools have their students satisfy the practical experience requirements before being granted the pharmaceutical degree. This practical-experience requirement is frequently fulfilled by work in a clinic or hospital.

The relatively large proportion of women who study pharmacy in the area under discussion is noticeably larger than that in North America. The marked reduction in the number of women who are graduated in contrast to the number enrolled would appear to indicate a high academic mortality, or perhaps they leave school to marry.

A detailed study of the objectives and content of the elementary and secondary school curriculums, as well as that of the pharmacy courses, would be of marked value in contrasting and evaluating their pharmaceutical education with that now current in the United States. Likewise, it is anticipated that a study of pharmaceutical education in Mexico will be made along lines carried out in this paper.

Those familiar with the history and development of Central and South America may note with particular satisfaction the great strides which are being made in the elevation of academic standards, the reduction of illiteracy, and the improvement in health conditions. Among the agencies assisting in these developments is the Rockefeller Foundation. In its annual report for 1956 the Foundation reported that it had appropriated in this year more than a million

dollars for medical education and public health work in South America. Another vitally important agency contributing to the elevation of health standards is the role played by the pharmacy schools and the pharmacists.

It irritates the Editor to see this money which is the product of the drug industry which our educational system has helped to create, continue to go to the support of medical institutions operated by medical men who are the most severe critics of the druggists' relationship to the manufacturer of medicines.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 504 (1937)

ARTICLES

IMPRESSIONS OF A MISSION TO LEBANON AND YUGOSLAVIA*

G. VALETTE

Note: Professor G. Valette of the Faculty of Pharmacy of Paris visited Yugoslavia in May of 1956 on invitation by the Associations of Pharmacy of Belgrade, Zagreb, and Ljubljana. There he spoke in the three cities, capitals respectively of Serbia, Croatia, and Slovenia. On his return to Paris, Professor Valette presented before the Academie de Pharmacie the following impressions of the educational and professional situation in that country.

Under the current pharmaceutical educational system in Yugoslavia there are now two faculties, one at Belgrade and the other in Zagreb. Ljubljana has an Institute of Technology in which a pharmaceutical program is in the course of organization. However, at present, this program includes only the first year of studies.

Altogether the number of students is about 1,500 of which 90 per cent are women, from a population of about 17,000,000 inhabitants, a sufficiently high ratio. It fails only to meet the needs for pharmacists in the rural areas and particularly in the central regions of Macedonia and Montenegro.

It can be said that at Belgrade, where the Faculty is celebrating its tenth anniversary, the organization of the educational program is strongly influenced by that in France. There are five years of studies followed by an internship. The course of studies is the same as in France plus a course in social work and social hygiene.

The teaching staff is large and includes on this faculty, twenty-one professors, lecturers, course heads, and temporary teachers, forty-two assistants and instructors.

The Dean, assisted by the professors, oversees the direction of the Faculty. In addition to what is known in France as the Faculty Council, there is a much larger council which also includes nonuniversity members chosen by the Chamber of Deputies.

At Zagreb the institution is very old, and pharmacy studies are still completed in four years. But there is currently a program of reorganization under way to unify the curricula of the two pharmaceutical educational institutions.

In considering the status of the pharmaceutical profession, it is astonishing to observe the profound repercussions of the social structure that Yugoslavia has adopted since the Revolution of 1941-45.

The pharmacists now are all civil servants and are paid a base salary of about 10,000 dinars to which is added a nearly equivalent municipal stipend and various fees bringing the total to 20,000 to 25,000 dinars per month. These earnings are even higher in the rural areas where pharmacists hesitate to settle.

* An excerpt from the original article which appeared in *Annales Pharmaceutiques Francaises*, 14, 58 (Professional Section), 1956, translated by Theodore O. King.

At the present time there are 2,800 pharmacists in Yugoslavia working in 1,000 pharmacies. The trend in the larger cities is to centralize the dispensing of medicines as much as possible. This is such that on the principal square of Zagreb only one of five pharmacies has been allowed to remain. This "Central Pharmacy" employs sixty pharmacists and, far from having that commercial aspect so often deplored in France, gives the impression of a bank or administration building where all functions are carried out smoothly with meticulous attention.

Yugoslav physicians have maintained the custom of prescribing preparations of their own formulation, and the compounding of these prescriptions makes up a large part of the work of the prescription department. The prescription specialty, however, is not neglected. The number of prescription specialties is about 1,500 among which 75 per cent are of Yugoslavian origin, the others coming from France, Germany, Switzerland, and the United States. (It is curious to note that many of the German-made specialties such as syrups of ephedrine and pholcodine are labelled in the French language.)

It is interesting to note that the pharmacist in Yugoslavia is authorized to replace, in good faith, one specialty with another similar preparation and that it is also the custom of the physician to follow his order for a prescription specialty with the words, *Aut similis*.

The laboratory control of pharmaceuticals, specialties or otherwise, is a problem which deservedly occupies the attention of the professional organizations. I had the privilege of visiting an official laboratory at Zagreb where the sections of physics, chemistry, and pharmacology were in full swing.

Finally, a word about the pharmaceutical industry. The laboratories I visited at Zagreb manufacture chemical products (antibiotics, sulfonamides, alkaloids, etc.) as well as galenical and processed products.

The director of such a firm is nominated by the Minister of Industry but must be approved by the "collective" in order to keep his position. The investments and expenses of the operation are regulated by the government, but the production and development depend only upon the initiative of the board of directors composed of the Director and several members of the collective elected by the employees. All members of the staff are civil servants and receive salaries of the order already cited for the prescription pharmacist but varying with the level of production (80 per cent to 140 per cent of the base salary).

Such are the observations I made during the course of my trip. I cannot refrain from mentioning the warmth of the welcome I encountered everywhere.

I think if we want to attract higher idealism to our student body it must be because there is something about me, as a teacher and something about you as a board member, or a practitioner that will appeal to the idealism of youth.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 448 (1937)

THE LYNN FILE

JOHN W. SCHERMERHORN AND MAYNARD W. QUIMBY

Beginning around 1940 and continuing almost to the time of his death, December 31, 1955, Dr. Eldin V. Lynn, Research Professor of Chemistry and Acting Director of the Samuel M. Best Research Laboratory at the Massachusetts College of Pharmacy, devoted most of his leisure time to collecting and indexing all printed references dealing with phytochemical investigations. At the time of his death he had completed this work for the period from 1540 through 1953 and into 1954. The fruits of his labor fill five double drawers of a filing cabinet with some 80,000 3½" x 6" slips which, in the opinion of the editors, comprise one of the most complete bibliographies ever attempted.

The file was set up in three sections organized essentially as follows:

1. An alphabetical listing by generic name of plants investigated with the results of the investigations and the names of the authors and the dates of their work.
2. An alphabetical listing of pure substances, mixtures, and classes of materials reported to occur in plants, with references to the original works.
3. An alphabetical listing, by year, of authors, and complete bibliographic citations of their works.

For almost a year the editors have been organizing this material into a permanent and usable form. As a necessary starting point a format had to be devised. Many persons and many groups were consulted, and much valuable advice and guidance was received. The final product is, indeed, a distillate of many of their suggestions.

When completed, this work will consist of approximately sixty monographs including a consideration of fifty-two orders of vascular plants as well as a great deal of material concerning the algae, the lichens, the fungi, and the mosses. Of the higher plants alone there are more than 220 families, 2,400 genera, and an undetermined number of species.

Because many investigators failed to indicate the family to which a given plant belonged, the editors' first step was to make these assignments. Some misspellings of scientific names, some use of common names, and the inclusion of a few animal products made this task more difficult.

The final phase of the work was the actual organization of the material in monograph form. Since the bibliography was to be annotated, it was necessary to group together similar reports on a given plant. Where many studies have been made on a particular plant, this grouping proved especially difficult. And, finally, all references had to be checked for accuracy. This checking was complicated, for Dr. Lynn had frequently included several references in a single bibliographic citation.

In its finished form a monograph will consist of a series of "chapters," each listing of its genera and species. Immediately following each species names will be placed other scientific names by which the plant has been known, and such names will be cross-referenced in the appropriate places. Common names reported in studies on a particular species will follow; and, finally, very brief abstracts of the work performed will be given.

From time to time generic indexes will be issued, listing in alphabetical

order the families in which the genera have been placed. At the completion of the work all of these will be combined in a single master index.

In addition to the monograph now completed, there are four others in various stages of completion. The editors believe that about two years will be needed to finish the undertaking. Finally, the chemical file will be assembled as the last link in this work. The user will then be able to determine what work has been performed on a given plant, or what substances have been reported in the plant, or what plants contain a substance he may wish to obtain.

As they become available, the monographs will be offered by the Massachusetts College of Pharmacy. Arrangements for distribution are now being made and will be announced at an early date in a number of journals. (Editor's Note: See New Book section of this issue.)

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I am for anything that will improve the spiritual and the intellectual quality of the student body pharmaceutic, but I believe the work is to be done on the practitioner's side of the fence by setting a finer standard of professional idealism and a finer standard of living up to that professional ideal.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 490 (1937)

PRESENT PROBLEMS IN THE RECRUITMENT OF STUDENTS

JAMES A. KEARNS

We have all heard about the expected increase in college enrollments in the near future. In fact, some people speak of this with alarm, stating that the number of young men and women who will seek a college education will so far exceed the facilities of the colleges, that the effect will be similar to the deluge caused by a tidal wave. This increase in college applicants will be the result of the increasing birth rate in this country since 1946. Assuming that a child born in 1946 enters college at the age of seventeen, the colleges can expect to be faced with large numbers of applicants in 1963. The numbers will be just as high in the years which follow; and, as a result, colleges and universities must make adjustments to accommodate much larger enrollments.

"If this is the case," one may ask, "why are we spending our time on the subject of the recruitment of students? Should we not spend the time now in planning to handle larger numbers of students?" Perhaps we should. However, can the colleges of pharmacy be certain that there will be large numbers of ***qualified*** students seeking admission seven years from now?

By using the statistics on the number of children born since 1945, one could argue convincingly that from 1963 on, pharmacy colleges will have more applicants. Quantity, however, is not the sole consideration. In fact, the quality of the applicants is more important in a professional program than is the quantity. Now, if sufficient evidence could be brought forth to show that along with the increase in quantity there will be a corresponding increase in the quality of the applicants, then pharmaceutical educators could be quite complacent about the future. There is, however, no such evidence available, and it would certainly be foolhardy to be complacent about the future under the circumstances.

If we, at Rutgers, had become complacent about this matter, we were startled out of this attitude during the past year. The reason was that although there was no appreciable decrease in the number of applicants to the prepharmacy and pharmacy programs, there was a marked decrease in the number who were able to meet the admissions requirements, even though these requirements were no higher than they had been in previous years. The College had only two choices—either to lower the admissions standards and admit the usual number, or to maintain the standards and admit fewer applicants. We chose the latter course for obvious reasons. This is disturbing, however, in view of the demands for pharmacists in New Jersey.

As you can well imagine, this situation has led to a good deal of self-examination to determine what part we may have played in bringing about this decrease in the number of qualified applicants.

One of the first questions that we asked was, "Are we losing the better qualified applicants to other colleges of pharmacy?" Although Rutgers is the only college of pharmacy in New Jersey, there are a number of residents of the state who attend out-of-state colleges of pharmacy. They do so primarily for one of two reasons—either they have the desire to attend a campus college, or they wish to attend a college that is readily accessible to their homes. Since our college is not yet on the campus of the University, we lose those students who prefer the campus-type college; and since our college is a commuters' college, we lose

those students who find it easier to commute to Philadelphia or to a New York college of pharmacy. There is no reason for us to believe that we are now losing any greater percentage of the qualified young men and women to other colleges of pharmacy than we have in the past.

If the qualified students are not being lost to other colleges of pharmacy, where are they? There are two possibilities: (1) that they are not going to college, or (2) that they are going to a college other than a college of pharmacy. Enrollment reports from colleges and universities in the surrounding area indicate that they are experiencing increases; hence, one is led to conclude that the qualified students that we have lost are not only lost to us but lost to pharmacy; and that they have been gained by some other field or profession. We, at Rutgers, have no way of knowing how widespread this situation is in AACP District No. 2 or, for that matter, throughout the country; but if our analysis of the reasons for it is correct, it is or will be a problem that all colleges of pharmacy will be forced to face.

The reason that pharmacy is losing qualified students is not difficult to uncover. Every field and profession is doing everything possible to insure that it recruits a sufficient number of the capable young men and women. This recruitment has been going on for some time, but recently it has hit a new high. This is due to the fact that each profession and field has become very conscious of the needs for its services. Think for a moment. How many times have you heard or read recently about the shortage of engineers, teachers, and scientists? I am sure that you have been reminded of these shortages over and over again, for they have been proclaimed in newspaper and national magazine articles and have been the subjects of radio and television programs produced by the major networks. Not only you, but the parents and youth of America, have also been made aware of the needs for personnel in these fields.

In order to understand how this affects the recruitment of pharmacy students, one has only to realize that since pharmacy is primarily the study of the physical and biological sciences, the students who are capable of pursuing a pharmacy program are the same ones who are capable of successfully pursuing a program of science, engineering, and some specialization of education. This means that pharmacy is in competition with these other fields for essentially the same students, and pharmacy is not faring well in this competition. Many have realized this, and steps have been taken to develop a nationwide recruitment program. The booklet, *Shall I Study Pharmacy*, and the films which were recently completed are excellent; but they are small weapons against those of the competition.

For example, what recruitment aids do we have that are as effective as the many pages of job opportunities for engineers printed every day in the metropolitan newspapers? What do we have to counteract the many romanticized versions of scientists, engineers, and even teachers portrayed in every media of mass communication? In answering these questions, we must admit that, at present, we are not in any position to equal the intentional and unintentional recruitment programs of other fields.

This is not to say that pharmacy as a career is less rewarding in any sense than any other career, for it is *not*. Actually, the future of the practice of pharmacy, in my opinion, holds forth greater opportunities and rewards than these other fields. Parents and their children, however, are not influenced by

my opinion; but they are influenced by what they hear or see in the newspapers, magazines, books, movies, television, and radio.

It may appear, at this point, that the situation is hopeless, and that it is impossible for us to compete with the other fields for the more capable students. I do not believe that this is the case. I do believe, however, that some drastic steps must be taken before the odds against us can be reduced.

If you want to sell, you must know the product and you must *want* to sell it. Pharmacy, in selling itself, too often fails in both requisites. There is a mass of confusion among us as to what the practice of pharmacy should be; and, therefore, what the future of pharmacy should be. The result is that the practitioners, the press, the organizations, and the educators of pharmacy frequently talk at cross purposes, and, just as frequently, contradict each other.

It has been argued that pharmacy draws its strength from its dual nature: namely, part profession and part business. It is my opinion, however, that this has been and will continue to be one of its greatest weaknesses; for most of the confusion stems from the differences of opinion on what a pharmacist and a pharmacy should be in this dual situation. For example, it is not unusual to find in a publication of the pharmaceutical press that pharmacists are being praised because prescriptions are accounting for a greater percentage of their total income; while on the following pages, they are being criticized for selling fewer electric razors and mix-masters. Further, it is not unusual for an association to take pride in the fact that there are few soda fountains remaining in the drugstores of the state and that many of those which do exist are being removed; while the same association, in setting up a model of a *modern* pharmacy, devotes half the space to a soda fountain. Nor is it unusual for a state board intending to prevent self-service of medicine to refuse to allow pharmacists to display any medicine openly; while in the official publication of the state association, a number of ads appear encouraging the pharmacist to use self-service displays of medicine. Nor is it unusual to have a pharmacist talk about his profession, then suddenly begin referring to it as the "retail trade" or to himself as a "retail druggist."

Some in pharmacy do not see the inconsistencies in the examples just cited. Unfortunately, however, the layman does see them, and he is the one we are trying to convince. There is a great need for an over-all philosophy on the practice of pharmacy and its future, placing emphasis on the professional operation of a pharmacist, and relegating the nonprofessional operations to their proper, but less important, places. Without this philosophy, there are no guides by which to steer a course; there are no goals for which to strive. Instead, there is just aimless drifting, being blown one way and then the other by the pressures of fads or groups that have little or nothing to do with the betterment of pharmacy. With definite objectives stated and the course outlined for the attainment of these objectives, pharmacy will begin to have direction, and pharmacists will begin to understand the profession they are selling to the public.

There is a need, too, for a feeling of pride and "esprit de corps" in the practice of pharmacy. This can be attained by emphasis on professionalism. Certainly pharmacy, like any other profession, has its blemishes, but there is no reason for pharmacists to advertise them to the world. There is a need to accent the positive and constructive points, not the faults nor the weaknesses.

For example, why persist in calling the major group of pharmacy "retail" pharmacists. There is nothing professional about the word, "retail"; in fact,

it implies quite the opposite. It places the majority of pharmacists and pharmacies in a category which is not associated, by the public, with a profession. It is just as easy to use terms such as "the practice of pharmacy" or the "public practice of pharmacy," instead of "retail pharmacy" or, far worse, "retail trade." It is not difficult to substitute "general practitioner" or "public practitioner" for "retail pharmacist" or "retail druggist."

By making these changes in terminology, we are placing the emphasis where it belongs—on the professional aspects of pharmacy. There are many other changes that are necessary, but some of them are not as easy to make as those just mentioned. These changes must be made, however, if pharmacists are going to believe strongly in their profession.

In conclusion, I wish to state that regardless of the devices and techniques that are employed to recruit students for colleges of pharmacy, the profession of pharmacy will always be working with the odds against it. However, when pharmacy has a philosophy which is accepted by its members and they, in turn, have a strong feeling of pride in their profession, there will be little need to concern ourselves with the recruitment of capable young men and women; for the profession will be sold to the public through the everyday activities of its thousands of practitioners.

The material things I saw that day belong to another age. They are gone with the wind. But the spiritual things live on, a blessing to humanity . . . . Only spiritual things are eternal.

Rufus A. Lyman, Am. J. Pharm. Ed., 1, 106 (1937)

PHARMACY AND CIVILIZATION*

DAVID L. COWEN

There is a temptation for anyone who works in the history of pharmacy to think of pharmacy as the measuring stick of civilization, for pharmacy in all ages reflected the extent to which a particular society was able to adjust itself to its environment through its religion, or its science, or its technology, or otherwise.

But there is a danger here—a danger implicit in any oversimplified, monistic interpretation of events and accomplishments. I therefore would like to avoid the appearance of judging the quality of a civilization on the basis of its pharmacy, and I want to approach my topic from the point of view that the history of pharmacy *is* the history of civilization; or to put it another way, that the history of civilization can be understood and exemplified by the history of pharmacy.

PHARMACY ILLUSTRATIVE OF CULTURAL HISTORY

To begin with, there is a myriad of specific illustrations that the general historian may take from the history of pharmacy. He can, for example, provide no better illustration of ancient Egyptian hieroglyphics, and the high degree of cultural accomplishments they indicate, than the Ebers Papyrus, and its 800 or so prescriptions, and no better example of Mesopotamian cuneiform tablets than those containing the materia medica of the Assyrians.

If he is seeking to illuminate the Puritan Revolt in England in the mid-seventeenth century, and to underscore the fury and hatred that that Civil War engendered, he can refer his student to Nicholas Culpeper's translations of the London Pharmacopeia. There he will find all the religious and political undertones in the prefatory material; there he will find the "spleen of a Roundhead" splattered throughout the work.

This is indeed a very strange place to find religious and political controversy, but that very fact is itself an indication of the intensity and all-pervasiveness of the cleavages in British life, and the long-lasting bitterness of the fruits of the Protestant Revolt of more than a century before.

Should the historian seek to illustrate the condition of George Washington's army in the winter of 1778, he might point to the famous Lititz Pharmacopeia, the first native American work of its kind. This small Latin book, called the "Pharmacopeia of Simple and Efficacious Remedies for the Use of the Military Hospital Belonging to the Army of the United States of America," contained a list of but eighty-four internal medicines and sixteen external remedies, based on a materia medica of about 200 items. This is quite small in comparison with the Pharmacopeias of the Royal Colleges, and with even those of various British hospitals, but this was to be expected of a military hospital.

More significant, however, was the provision in the Lititz Pharmacopeia for substitutions, cider vinegar for wine vinegar, and linseed oil, or lard, or sweet almond oil for olive oil. For barley water, three substitutions were recommended: rice water, baked bread water, and toasted bread water. These were to be used as "a universal potion," and it is noteworthy that none of the last three was to be found in British pharmacopeias.

* Presented before the Alpha Eta Chapter of Rho Chi April 4, 1956, on the occasion of the induction of the author into honorary membership.

If the historian wishes to illustrate our heritage from Great Britain he might again point to this Lititz Pharmacopeia. Its compiler was one Dr. William Brown, who had been trained at Edinburgh; its contents were derived, as Dr. George Urdang has shown, from the pharmacopeias of the two Royal Colleges of Physicians, and of two hospitals in England and Scotland.

One other such illustration is particularly interesting at the present time. The historian seeking to understand the background of the problem of segregation in the United States cannot disregard the significance of the fact that in the eighteenth century several of the southern colonies made it illegal for anyone to impart to any slave any knowledge of medicines, particularly poisons, or for any slave (some restrictions were placed on negroes, mullatoes, and mestizos, free or slave) to prepare or administer medicines. Usually the penalty was death. South Carolina even prohibited the employment of slaves by any physician, apothecary, or druggist, wherever medicines were kept. The racial problem in the South had some of its roots, at least, in the problem of biological survival.

Such illustrations could probably be multiplied indefinitely, but I should like to turn my attention to the broader idea that the character and ideology of a civilization is reflected in its pharmacy.

THE PREHISTORIC AND ANCIENT WORLD

Let us start at the very beginning with prehistoric man. Where must the anthropologist turn for his illustrations of the "mind" of primitive man? His art and his artifacts give some clue, but it is his medicine and pharmacy—and medicine and pharmacy are inseparable for a long time thereafter—which illustrate the fears, the superstitions, the haunting animism of preliterate man. Primitive materia medica was of two kinds. One was botanical, and perhaps had its origins in pure animal instinct—itself an indication of the closeness of prehistoric man to what the philosophers used to call the "state of nature." The other was magical, ritualistic, mystic. It consisted of charms, fetishes, and amulets, or of incantations and exorcisms known only to the priest-medicine man. It consisted of such things as bones, symbolically marked, that were cast on the ground, for divination was an important part of the diagnosis. The medicine man, who diagnosed, prepared, and administered the remedies, played magic against magic, spirit against spirit, and superstitions against fear.

The first civilizations of the Near East made tremendous strides beyond the culture of the Neolithic Age out of which they sprang. Written language, the use of metals, mathematics and measures, organized states and organized religions, architecture and engineering were some of the awe-inspiring tributes to the potentialities of the human mind. Thus, too, as to be expected, medicine and pharmacy were to make great strides in the civilizations of Egypt and Mesopotamia.

There was, of course, a great deal that was retained of the exorcism and divination of the earlier time, but there was indeed a great deal that was rational and suggestive of a scientific spirit. The number of drugs that the ancients used, systematized, and recorded in papyri and clay tablets is astounding. Many remained in the antidotaria of the pharmacist for three millenia; some are still to be found in our pharmacopeias. Specialists—themselves, in any field, an indication of the growing complexity of society—appeared; specialists who prepared, and others who sold, drugs. Wines, draughts, mixtures, ointments, extractions, cataplasms, enemas, poultices, plasters, lotions, infusions, decoctions, and fumigations were all known to the ancients.

These accomplishments indicate, just as does the building of a pyramid, the immensity of the accomplishment of ancient peoples. But perhaps more significant, and underlying all of these tangibles, is the fact that ancient pharmacy and medicine were in accord with one of the basic features of ancient civilization (particularly in Egypt)—its underlying religious and theocratic foundations. The term "theocracy" indicates the identity of church and state. The pharaoh was not God, but he was God's chosen and the head of the church. It is not surprising, therefore, that the historian points to the basic feature of archaic medicine, as its "theurgic" qualities. That is to say, that medicine in antiquity thought of disease as a divine punishment and of healing as a process of purification, or catharsis. Dr. Urdang believes that the Greek word *pharmakon*, from which our "pharmacy" derives, took on the meaning of purification through purging. Thus we find again that pharmacy reflects an underlying cultural characteristic.

HELLENIC CIVILIZATION

As we move on to the world of the ancient Hellenic Greeks, particularly the three centuries from 600 to 300 B.C., we find a considerably different culture. Here we find an individualistic society, concerned with liberty, aesthetics, and speculation. Here philosophers flourished, and it is their concern for understanding the world of nature, their search for a single unifying principle, that would explain all phenomena to which we need to turn our attention. The Milesian school of philosopher-scientists came up with a variety of answers. Thales thought that this unifying principle was water. His followers selected, instead, air, fire, or earth, as the primary substance from which all things came. These four were eventually grouped together and became known as the "Aristotelian" elements. For many centuries thereafter physics, chemistry, and medicine were based on this theory of the four elements.

One other concept pervaded Hellenic thought—in aesthetics, in philosophy, and indeed in daily living—the concept of harmony.

It was therefore not difficult for Empedocles to theorize that the health of the body was dependent upon a harmony of the four elements, and out of this there grew a system of medicine that was not to be challenged until about 2000 years later. For it was from this theory of the four elements that there developed the Hippocratic theory of the four humors, and the Hippocratic theory that the first requirement of medical treatment was the purification of the body from its illness-producing humors. Here we have the key to the role of pharmacy in this scheme, for the medicaments named in the writings of the Hippocratic school abound with purgatives, sudorifics, emetics, and enemas.

It is to be noted that this was essentially a rational system of medicine, no matter how erroneous some of its assumptions. Indeed, among the Greeks, it was handled rationally and with moderation—clinical and dietic attention to the individual patient was more essential to the Hippocratic system than attention to rules.

Thus, in ancient Greece as well, we see that medicine and pharmacy reflect a basic characteristic of the culture.

ROMAN CIVILIZATION

Moving on now to ancient Rome, we find a society that was essentially materialistic and extrovertive, more interested in organization than in creativeness and speculation. The art, the literature, the philosophy, the science of Rome

were essentially eclectic and imitative. (I am saying this without intending to belittle the individual accomplishments of many great figures.) The same can be said with regard to its pharmacy and medicine, where two great names stand out: Celsus and Galen.

Both of these men illustrate perfectly the characteristically Roman role in civilization. Celsus, not even a physician, was an encyclopedist; his *De Medicina*, undoubtedly a valuable work, was a compilation and systemization of Hellenic medicine.

Galen's work was this too, but, even more characteristically, Galen proceeded to make the humoral theory of Hippocrates a stringent *rule*, not only of medicine, but also of pharmacology. Galen's materia medica was arranged on the basis of the degree of dryness, heat, moisture, or cold that the particular drug would develop in the body, for each of the humors carried attributes of one of the four basic elements.

Pharmacy and medicine was Galenic without challenge until the sixteenth century, and continued, though challenged, into the eighteenth century. Our use of the term "Galenical" in pharmacy today is indicative of the tremendous impact of this physician of the second century A.D.

THE MIDDLE AGES

With the collapse of the Roman power in the West in 476 A.D., Europe entered into that period of history known as the Middle Ages. Although it is true that the Middle Ages, even the first few hundred years, were not as abysmally dark and ignorant as used to be thought, it is also true that the chief characteristics of this age were that it was a static society, provincial in outlook, otherworldly in aspirations, and authoritarian. For years what learning prevailed was found in association with the monasteries, and for the most part that "learning" consisted of copying. In medicine and pharmacy this was also true. The lack of originality, the credulous, unquestioning acceptance of authority, is typical of medical and pharmaceutical work, and Galen and Dioscorides were guides in practice as well as in the library. This was true, also, of men like Cassidorus and Bishop Isadore of Seville, in the sixth and seventh centuries, or the compilations of the School of Salerno in the twelfth century.

Mention of the last brings to mind the fact that European medicine and pharmacy were greatly indebted to the Saracenic civilization which blossomed in the seventh century A.D. In fact, it is in these fields that the impact of this remarkable civilization can perhaps best be illustrated. It was the Saracens who were probably responsible for introducing the pharmacy shop into Europe, as a separate establishment; it was they—Rhazes, Avicenna especially—whose works, based largely on those of Galen and Dioscorides, were translated into Latin and became the basis for European pharmacy. The eleventh-century work of pseudo-Mesuë, based on earlier Saracenic works, was said to be in use "in practically every European pharmacy."

I cannot leave the Middle Ages without pointing out that in its last three centuries, from 1000-1300 A.D., there developed a system of town economy based on guilds. Here, too, one can find that pharmacy is representative of the whole system. Apothecaries belonged to almost 200 guilds in France at one time, about half of them being exclusively restricted to the apothecary. (It is of interest to note that the apothecary was frequently associated with physicians, surgeons, spicers, or grocers in the guilds. Affiliated or separated, jurisdictional disputes,

particularly with the last two, were common. Indeed the current quarrel between the pharmacist and the grocer now being fought out in the state legislative halls in the United States is already 700 years old.)

THE RENAISSANCE

The Middle Ages were followed by the period known as the Renaissance, from 1300 to 1650 A.D. European civilization took on a varied character: one aspect of it was concerned with a reawakened interest in antiquity and the classics; another was concerned with a new approach to life: individualistic, egotistic, hedonistic, and critical of authority.

Both of these aspects are of course reflected in medicine and pharmacy of the age. The first is illustrated by the fact that the first medical book to appear (in 1478) in the newly invented printed form was that of Celsus' *De Medicina*. The medicine of this age was thus tremendously influenced by the Hippocratic system, for no other authority was available so widely. Similarly, in 1651, Nicholas Culpeper added a "Key to Galen and Hippocrates" to his translation of the London Pharmacopeia, and arranged his work on a Galenic basis.

The second aspect of the Renaissance can readily be symbolized by the figure of Phillipus Theophrastus Bombastus von Hohenheim, traveller, philosopher, social theorist, astrologer, alchemist, physician, rabble-rouser, and self-styled friend of necromancers and witches, who lived from 1493 till 1541. Few men of the Renaissance exemplify its spirit better: von Hohenheim blithely assumed for himself the name Paracelsus, egotistically pointing up his superiority to the great Celsus whose work was so popular at the time.

But Paracelsus' real contribution lay in his rejection of authority. He had the temerity to oppose the humoral pathology of the ancients, and is reported to have publicly burned the works of Galen and Avicenna. Paracelsus suggested the concept of the body as a chemical laboratory and advocated the internal use of chemicals. Many tinctures, essences, quintessences, and extracts in pharmacy owe their introduction to Paracelsus, as do other, more truly chemical, medicaments.

THE EARLY MODERN WORLD

The Renaissance was followed by an Age of Enlightenment (1650-1750), an age where ideas of rationalism, sensationalism, and mechanism would lead to religious skepticism, political and economic revolution, and a new age of science. Here alone, it seems to me, did pharmacy not reflect the spirit of the times. Here pharmacy lagged as it slowly accepted Paracelsian remedies without rejecting the ancient remedies, some of the vilest sort. It was very late in this "Enlightened" period for example, that the Edinburgh Pharmacopeia listed among the simples, the blood, urine, fat, milk, cranium, and mummy of man!

The development of science in the early modern period is a direct outgrowth of the rationalism and sensationalism of the Enlightenment. Modern physics, chemistry, and botany developed in the seventeenth and eighteenth centuries, and a new age of science dawned. Pharmacy both played a part in the development of this scientific age, and was itself greatly altered by it. Indeed, there is at this point so much to be said that I shall have to be extremely selective.

The part of pharmacy in the growth of science is exemplified first by the interest of the pharmacist in botany. Extremely important botanical gardens in Italy, France, and Great Britain were instituted and operated by apothecaries. The Physic Garden at Chelsea was run by the Apothecaries Society of London

and largely supported by the apothecaries; its collections were really botanical rather than medicinal. The great Linnaeus visited and augmented his collections at Chelsea. Annually, the Apothecaries Garden presented the Royal Society with fifty botanical specimens.

In chemistry, pharmacy played an even more direct role. Here the work of Scheele with oxygen and the halogens, Döbereiner with the grouping of elements, Klaproth and the discovery of uranium, zirconium, and cerium, and the work of Sertürner, Pelletier, and Caventou in the vegetable alkaloids are just a very few illustrations of the contributions of the pharmacist to chemistry. Very many more are to be found.

The impact in the other direction of the new science on pharmacy is evident to anyone who has examined a pharmacopeia of the last part of the eighteenth century. First, the new scientific attitude led to a cleansing of the pharmacopeia: the old animal simples, some quite disgusting, were eliminated; the vegetable simples were greatly reduced in number; and new chemical drugs were added. Second, the new scientific nomenclature was adopted, both chemically and botanically. Third, the new quantitative chemistry was introduced into pharmacy, and standardization and assaying became scientifically possible.

THE NINETEENTH AND TWENTIETH CENTURIES

As the nineteenth century progressed there developed pharmacognosy, pharmacology, and toxicology, and pharmacy was becoming a science. "According to the art" became increasingly premised on scientific understanding, and, as we come finally to modern times, it becomes almost impossible to discuss my thesis in all its possible ramifications. Permit me to point up a few of these that come to mind.

This age has been characterized as an age of science; one need only thumb through the pages of the sixteen issues of the USP, or compare the curriculum of a college of pharmacy today with what it was but a generation ago, to recognize that pharmacy is both a beneficiary of and a contributor to this age of science. This is also a technological age, and one need only recognize the changing requirements of operating "according to the art," or more specifically, one need only compare an apothecary's pill roller with the pill machine of a modern pharmaceutical manufacturing house to appreciate the role of mechanization in our society. This is a dynamic age; rapid change is one of our chief characteristics. Is there a better illustration of the speed with which we move than to point out that the sulfa drugs, the hormone derivatives, and the antibiotics are but developments of the last twenty-five years? This is an age where benefits have been widely diffused to an increasingly larger proportion of the populace. We need point only to the increasing life expectancy in our society, and emphasize that pharmacy plays its part in the medical sciences in making this possible. This is also an age in which complexity has given to our political institutions an increasingly greater responsibility for the maintenance of the general welfare. In pharmacy, the growth of licensing legislation, the narcotics and pure food and drug acts, the fair trade laws are all cases in point. Finally, our civilization is a materialistic, hedonistic one which has about it a frenetic quality. What better evidence of this can be found than in the tremendous demand for soporific, stimulant, and tranquilizing drugs? The paradoxical nature of this three-fold demand is itself an indication of the perplexities and frustrations of modern civilization.

Pharmacy can thus illustrate the foibles, as well as the very essence, of a given civilization. Perhaps this paper has given some evidence that the study of the history of pharmacy is a liberal study, broad and humanistic in its scope, and in itself as exciting as the whole history of mankind of which it is a microcosm.

I am quite . . . familiar with the inner workings of the medical, the dental, and the nursing professions and the Presbyterian Church of which I am a devoted member. And I know they are quite as commercialized as pharmacy. The difference lies in the fact that the commercialism in these other fields can more easily be covered with a cloak of humanitarianism. In pharmacy we have merchandise to sell and merchandise cannot be covered up.

Rufus A. Lyman, Am. J. Pharm. Ed., 2, 378 (1938)

THE LIBRARY'S RESPONSIBILITY TO THE PHARMACY FACULTY

MARTHA JANE K. ZACHERT

Are faculty members the forgotten patrons of pharmacy school libraries? Well, how long is it since *your* library has done something for *you*? How long has it been since you made a request of your library? Do you know what the library's role is in pharmacy education, what it can do for you, what you can reasonably expect of it?

The library has two traditional roles in pharmacy education as well as in general education, and a growing number of roles not in the least traditional in any type of education.

MATERIALS

The first traditional role is that of acquiring and organizing all kinds of materials valuable to a college of pharmacy. In other words, the library is first and foremost a materials center. It supplies these materials to the professor in his classroom preparation; it helps keep him abreast of latest developments and trends in his specialized field; it lends major assistance in his personal research.

Acquisition is usually by purchase, along patterns familiar to most faculty members. However, this responsibility is not necessarily accomplished in this way, especially in the area of materials for personal research. Very few budgets will stretch to include this type of purchasing. Nevertheless, the librarian can render a great service to the researcher by his knowledge of special materials available through loan. The librarian knows ways to locate these materials for inter-library loan purposes through regional and national union catalogs and union lists. He belongs to one or more national associations of librarians (1), thereby increasing his circle of professional acquaintances on whom he can call for help. Both the Medical Library Association and the Special Libraries Association emphasize the dissemination of information about the libraries of their members, so that the alert librarian in a pharmacy college knows, or can easily find out, what special libraries in the area have materials in the fields of faculty interest. He also knows, or can easily find out, what policies regulate the use of these materials.

SERVICES

The second of the library's traditional roles is that of service center—bringing together users and the materials they need. This includes reference service, the retrieval of information from books and periodicals; and reader's advisory service, personal guidance for fun and profit. Reference services to faculties include answering quick, informational questions, providing research on more involved questions, making subject bibliographies, tracking down book and periodical references (both correct and, alas, jumbled).

The reader's advisory service has not been stressed so much in pharmacy schools, perhaps, as in some other types of educational institutions. But it includes the professional "fringe" reading which can be both instructional and inspirational, but which seldom turns up on assignments. I'm thinking of such areas as history of pharmacy and medicine, biography of scientists, research developments in areas related to pharmacy. If we really believe that pharmacy education is a well-rounded education as well as a vocational technique, then we, as educators,

must make it so. Professors must themselves read this material so as to pass on to their students the inspiration to read it. And libraries must accept the responsibility for leading the faculty into this type of reading. The library can call the faculty's attention to this material in several ways: issuing publications reviewing or at least listing new materials of this type; reviewing the books at faculty meetings; preparing special displays for faculty meetings or for the faculty lounge.

Among the library's service functions are some which are not quite so traditional as reference and reader's advisory work. One is a communication service: reporting to the faculty what new materials come into the library, reporting outstanding opportunities for summer or advanced study as notices of these arrive, reporting the existence of, or plans for, new teaching materials.

Another is a service to facilitate the teacher's use of materials. It would be delightful if every teacher had enough time in preparation for each class to survey all available materials and choose the very best. There just isn't that much time, so school libraries owe it to their faculties to help solve this problem. There are many ways this can be done. Here is an example of one solution to one such problem: There are no tools which cumulate information about audio-visual aids useful in advanced scientific and professional courses, and who can remember what was reviewed last week or last month? Our Library at the Southern College of Pharmacy keeps a card file, by subject, of those films which are likely to be useful. The librarian, in scanning all periodicals coming into the library, makes a note on a 3x5 card of the film title, producer, and physical description. A brief annotation is given along with the reference to the published review. This card is then filed by subject under which the film would be useful to us. This small investment of time by the library virtually eliminates wasted faculty time in searching for elusive audio-visual materials. Many other libraries have devised solutions to other problems of finding and using teaching materials. Is your pharmacy library helping you in this way? Suggestions as to your needs will be welcome.

TEACHING

The library has yet another function in pharmacy education: its own teaching function. Teaching students the materials in the library and how to use them relieves the teacher of the necessity of stopping to do this during class, at the same time it increases the student's ability to study profitably. Many pharmacy school libraries make some effort in this direction, some have highly developed programs (2, 3, 4), all should include it as a part of their regular contribution to the faculty.

The library also has a teaching responsibility to the faculty. It can and should sponsor exhibits, book reviews, seminars and workshops related to pharmacy education and to teaching materials. One example will illustrate the possibilities: In recent years there has been much emphasis on audio-visual materials. Yet many teachers on college faculties have had neither training nor experience in selection and use of these highly valuable materials. Following the receipt of a gift of several items of audio-visual equipment to the Southern College of Pharmacy Library, we decided to do something about preparing our faculty to use what had become available. The college administration and the library jointly sponsored an audio-visual workshop for our own faculty. A one-day affair, its object was *not* to produce audio-visual specialists in two short sessions. It *was* to instruct teachers in two techniques: how to evaluate available films critically,

and how to operate the basic types of projectors well enough that the motions of operation would not destroy the teaching situation. This instruction helped overcome the two great bugaboos of using audio-visual materials without forcing on the teachers more details than they wanted to know and without spending more time than they wanted to spend. Use of materials has increased in such proportions as to justify this kind of library activity.

How is the individual faculty member to know what his school library is prepared to do for him? One summary of methods of informing the teacher includes as possibilities displays, departmental meetings, publications, orientation for new faculty members, and individual conferences (5). On the faculty member rests the responsibility for paying attention to the various types of communications from the library, for being responsive to the libary's efforts to help him, for articulating specific needs. On the library rests the responsibility for responding to specific requests, for using all known methods of helping the teacher, and, when these are exhausted, for taking the initiative in inventing new methods.

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No profession can be improved without improving the quality of the men that go into it, and no profession will rise above the level of the men who enter its ranks.

Rufus A. Lyman, Am. J. Pharm. Ed., 5, 610 (1941)

REMINGTON HONOR MEDAL CITATION FOR W. PAUL BRIGGS*

HUGO H. SCHAEFER

In honoring W. Paul Briggs, we are honoring a man of unusual character and ability as is evidenced by his abundant and momentous accomplishments.

Born in Washington, D.C., he attended its schools and received his pharmaceutical education at George Washington University. Subsequent graduate work at the University of Maryland earned his his master's degree. He became a registered pharmacist in 1924 and owned and conducted his own pharmacy from 1925 to 1927.

I present these facts in order to stress that Dr. Briggs was a retail pharmacist and, no doubt, the experience gained in this capacity has much to do with his ensuing success in the broader areas of our profession. In 1927 he became a member of the faculty of the College of Pharmacy of George Washington University, and he became its Dean in 1932, in which capacity he served with great distinction until 1947. From 1946 to 1947 he was Director of the Pharmacy Division of the Veterans Administration, and from 1948 to 1951 he headed the Pharmacy Service of the Medical Service Corps of the United States Navy. Since then he has served as Secretary and Executive Director of the American Foundation for Pharmaceutical Education.

This brief factual presentation of the milestones in his career fails, however, to acquaint you with the inherent qualities and characteristics of our honored guest. W. Paul Briggs is a man of unusual modesty but with a driving force that gets results. His persistency of effort in everything he does is one of his outstanding attributes. His keen mind and good judgment have gained the respect of those who know him and more particularly of those who have worked with him. He is a man who has put to constructive use his varied abilities and fine qualities of character to an extent which tonight brings him the approbation, the plaudits, and the thanks of American Pharmacy.

W. Paul Briggs, it is indeed an honor and a pleasure to present to you the 1957 Remington Medal and to express the hope that you may continue to serve pharmacy for many years to come.

* Given at the Remington Medal Dinner, December 2, 1957, New York City.

No line of human activity has ever risen above its educational program, and no activity has continued to progress without such a program.

Rufus A. Lyman, Am. J. Pharm. Ed., 2, 385 (1938)

MINUTES OF THE INTERIM MEETING, EXECUTIVE COMMITTEE

Mayflower Hotel, Washington, D.C. November 1, 2, 1957

The meeting was called to order by Chairman Zopf, November 1 at 9:30 A.M.

Present: President, Tom D. Rowe; Past President, Harold G. Hewitt; Chairman, Louis C. Zopf; Perry A. Foote; Loyd E. Harris; E. Emerson Leuallen; Joseph B. Sprowls; Secretary-Treasurer, George L. Webster; Editor, Melvin R. Gibson.

Absent on account of illness: Vice President, John F. McCloskey.

After convening the meeting, the Chairman appointed a committee comprising Editor Gibson and Past President Hewitt to draft a memorial resolution expressing the sorrow of the members of the Executive Committee occasioned by the death of Dean Emeritus Rufus A. Lyman (Item 26). After the appointment of the committee, the members stood for a minute of silent prayer in tribute to the memory of Dr. Lyman.

Noting the absence of Vice President McCloskey and upon learning that he was recovering from surgery, by unanimous consent, the Secretary was directed to address a telegram to Dean McCloskey expressing our regret for his indisposition and our best wishes for a speedy recovery.

1. **Approval of the Minutes of the Annual Meeting and the Post-Convention Meeting.**

   These minutes were approved as printed in the *Journal*.

2. **Proposals for Additions to the Agenda.**

   Several additions were proposed and added with the assent of the committee.

3. **Communications.**

   a. Notice of the death of Dean Emeritus William F. Sudro about October 1, 1957, was read by the Secretary. No information was at hand regarding surviving family, hence no message could be sent immediately.

   b. The Secretary presented copies of a letter written on behalf of the Association to Mrs. Rufus A. Lyman; a letter to Westminster Presbyterian Church of Lincoln, Nebraska, transmitting the Association's contribution to a memorial fund in the name of Dr. Lyman; a letter of acknowledgement from Dr. Rufus A. Lyman, Jr., and from the church.

   c. The Secretary presented copies of a letter written on behalf of the Association to Mrs. Edward Spease on the occasion of the funeral of Past President Edward Spease; a letter to Christ Church, Episcopal, Hudson, Ohio, transmitting a contribution to a memorial fund in the name of Dean Spease; a letter of acknowledgement from Mrs. Spease and from the church.

   d. A letter of inquiry and application for associate membership from Hampden College of Pharmacy, accompanied by a check, was presented. See Item 25 for action.

   e. A copy of a resolution from the Indiana Pharmaceutical Association urging, "the postponement of the effective date of the minimum five year educational requirement for five years (from 1960 to 1965)" and recommending "a further study of the extension of the educational requirement in relation to the manpower needs of the profession."

f. A copy of the resolutions adopted by the Alabama Pharmaceutical Association. Those relating to educational requirements and standards were four in number:

"1. That APA continue to use its influence to maintain and strengthen the established standards of education and licensure for registered pharmacists under the Alabama Pharmacy Law and in conformity with NABP.

2. That APA strongly oppose any move that might lead to a reduction in the educational requirements for licensure of any profession of the healing arts.

3. That APA continue to seek the interest of desirable high school graduates in making pharmacy their career and urge its members throughout the state to continue their contact with high school students in their respective communities.

4. To promote purposes of APA Scholarship Foundation, and John W. Dargavel Foundation."

g. A letter from the University of Toronto inquiring as to method of affiliating with our Association.

h. An invitation to attend the Twenty-second Educational Conference in New York City, October 31 and November 1.

i. From Sterling Movies U.S.A., a contract for the sale of prints of the two recruiting aids films.

j. A suggestion from a dean of a member college that the Secretary obtain from member colleges the approximate cost of instruction per student.

k. An invitation addressed to all delegates and faculty members to attend the convention of the Hawaii Pharmaceutical Association in Honolulu, April 28 to May 1, 1958.

l. A letter of information regarding the special course in pharmacy librarianship offered at Columbia University during the period July 29 to August 16, 1957. Twenty-three persons enrolled in the course, and all completed it. Two of these persons were associated with a college of pharmacy library, two with a medical school library, two with a city public library, one with the FDA Medical Reference library, one with Consulate General of Lithuania, and fifteen with pharmaceutical industry.

m. An invitation for the Association to be represented at the Pasteur Fermentation Centennial, November 21, 1957, in New York City.

n. A letter from the U.S. Treasury Department T:R:PEO:S SP dated August 20, 1957, and signed by P. Henry Needham stating that this Association is "exempt from Federal income tax as an organization described in section 501(c)(3) of the Internal Revenue Code of 1954 as it is shown that you are organized and operated exclusively for educational purposes." In another paragraph it is stated: "Contributions made to you are deductible by the donors in computing their taxable income in the manner and to the extent provided by section 170 of the 1954 code.

"Bequests, legacies, devises or transfers to or for your use are deductible in computing the value of the taxable estate of a decedent for Federal estate tax purposes in the manner and to the extent provided by sections 2055 and 2106 of the 1954 code. Gifts of property to or for your use are deductible in computing taxable gifts for Federal gift tax purposes in the manner and to the extent provided by section 2522 of the 1954 code."

The original of this letter is a part of the minutes of this Association.

4. Progress Report, Committee on Recruitment Aids.

Chairman Deno had submitted a copy of his report to the Executive Committee of the American Foundation for Pharmaceutical Education. This was read to the Executive Committee by the Secretary. Highlights of the report were that the brochure *Shall I Study Pharmacy* continues to be used in good volume by the colleges of pharmacy and others. The motion picture films have been shown (combined to October 15, 1957) 3,335 times to audiences totalling 172,795 persons. On television, they have been shown 339 times to audiences estimated to be 18.1 million persons. The slidefilm has sold very slowly. A new contract permitting the sale of these films to purchasers other than member colleges has been signed with Sterling Movies U.S.A., Inc. It is intended that a wider ownership and showing will result. The *Pharmacy Study Portfolio* continues to sell but at a slower pace than at first. The third survey of graduate study in member colleges is under way. Another survey to determine undergraduate tuition and other costs and the number and amount of undergraduate scholarships and loan funds in member colleges is under way. The committee is considering the creation and printing of new aids to recruiting which will be discussed at its meeting in November. The Committee is undertaking to determine if the film showings, brochure distribution, and other recruiting efforts have resulted in attracting new students to pharmacy colleges. A questionnaire will be used to gather information.

5. Report of the Editor.

Dr. Gibson expressed his sorrow and sense of personal loss occasioned by the death of Dr. Lyman. He than spoke of his plans for increasing the number of paid subscribers among faculty members. With regard to the papers submitted from the Conference of Teachers, he reported that they are generally submitted in proper form as outlined in the instructions to authors. A few authors have failed consistently to observe the requested style, and these papers will be returned to the authors until compliance is obtained. The editorial office has insufficient time or help to re-cast improperly written typescripts.

He outlined the contents of the Fall issue 1957 and the annual changes in cover colors.

He called the attention of the Executive Committee to the practice of the Conference of Teachers of Pharmacy Administration of publishing papers presented at their annual meeting in a separate, self-sponsored publication. He was aware of the reasons why this practice was started and assured the Committee that the backlog of acceptable papers in this area had been eliminated and the *Journal* was ready and able to publish papers in pharmacy administration which met the standards of the Editor as promptly as papers in other subject-matter areas. There seemed to be little need for the separate publication, and it introduced the possibility that such prior publication would make these papers unsuitable for publication in the *Journal*. This last would deny a wide audience to the many deserving papers presented in this Conference.

A discussion of this situation followed, and the question was raised whether it was proper for any Teachers' Conference section to seek sponsorship for separate publication of their papers. It was pointed out that if this practice were continued the many generous friends of the Association would be frequently importuned to support these publications financially and thus reduce their contributions to the AFPE which generously supports our *Journal*. At the same

time, uninhibited separate publications of all papers presented to the Teachers' Conferences would withhold the good papers from the wider audience which they deserve and which is provided by the *Journal.*

As a result of the general discussion the following was offered and *moved* for adoption by Sprowls, seconded by Hewitt and passed:

Whereas, the official organ of the American Association of Colleges of Pharmacy, the *American Journal of Pharmaceutical Education,* is maintained by the Association at a considerable expense in order to provide a medium for the publication of papers of particular significance of pharmaceutical education, and

Whereas, all papers submitted to sections of the Conference of Teachers, which are deemed worthy, are published in the *Journal,* and

Whereas, there are many advantages in having one publication in which articles emanating from the Conference of Teachers may be found,

Therefore, *be it resolved* that the Executive Committee urges the sections of the Conference of Teachers to refrain from the separate publication of their proceedings.

6. Reports by Representatives to District Meetings.

Oral reports were received from Dean Sprowls on the District 2 Meeting, Dean Foote on the District 3 Meeting, Dean Zopf on the District 5 Meeting, and Dean Rowe on both Districts 7 and 8 Meetings. Other districts had been reported at the annual meeting. Since detailed reports of these meetings will be reproduced and distributed, the delegates are not required to make written reports to the Executive Committee.

7. Financing of Predictive Tests.

Dean Sprowls reported that progress is being made on the matter of financing this program and hoped to have a definitive report for action at the Annual Meeting in April, 1958.

8. Report of Committee on Permanent Secretary.

Chairman Zopf acted as Chairman of this subcommittee of the Executive Committee and was assisted by Dr. R. A. Deno and Secretary Webster. The report was in response to a recommendation contained in the address of Vice President (now President) Rowe at the Annual Meeting, April, 1957. The committee had met and reviewed the probable budget of the Association under the direction of a permanent secretary and staff. Some revisions were necessarily made in the budget as reported in the report of a former committee in 1952. It was recommended by the present committee that the duties of the Secretary-Treasurer and the Editor should not be combined in one office, and this was accepted by the Executive Committee. The probable budget of the Association with a full-time Secretary-Treasurer and staff and a part-time Editor and staff was presented and discussed (Appendix A, original copy, these minutes).

The special committee recommended that the Association be asked to approve the employment of a full-time secretary and give its approval to the establishment of a permanent office in a location to be approved by the Executive Committee. It also recommended that the Association be asked to approve the amount of the annual dues from each member and associate member college at five hundred dollars in order to establish a financial basis for the office of Secretary-Treasurer.

It was moved, Sprowls-Hewitt, that the recommendations of the subcommittee be approved and that the matter be referred to the Committee on

Constitution and Bylaws for presentation in proper form to the 1958 Annual Meeting of the Association. The motion carried the recommendation that a statement explaining the basis of and reasons for the proposed change in dues should accompany the proposed revision of the Bylaws. The motion was passed.

9. Enrollment Figures for the Fall of 1957.

Chairman Zopf reported that on the basis of incomplete reports from member colleges at the time of leaving his office, there was indication that the enrollment in the first period of 1957-1958 would be slightly lower than for 1956-1957. Dean Leuallen presented a survey from the members in District 2 which indicated a small decrease in pharmacy students in that district. Dean Foote reported a discouraging lack of interest in his attempt to elicit applications for free tuition scholarships in the University of Florida College of Pharmacy.

10. Affiliate Membership for Canadian Colleges of Pharmacy.

Chairman Zopf sought the advice of the Executive Committee on the nature and amount of information to be required of Canadian colleges of pharmacy who wished to become Affiliate Members of the Association. The resolution and the Bylaw establishing the affiliate membership was studied, and on the basis of these *it was moved,* Leuallen-Harris, that the Chairman determine by questionnaire if the applicant Canadian college of pharmacy is a member, in good standing, of the Canadian Conference of Pharmaceutical Faculties and also secure a copy of the latest catalog of the college.

If the question is answered affirmatively and the catalog is furnished, the college shall be considered eligible for membership and should be recommended for membership at the next annual meeting. The motion was passed.

It was moved, Rowe-Leuallen, that the Executive Committee recommend, to the Annual Meeting of the Association, the Faculty of Pharmacy of the University of Toronto for affiliate membership in the American Association of Colleges of Pharmacy. The motion was passed.

11. Report of the Meeting of the NARD.

Dean Rowe reported that he was granted an opportunity to speak to the convention of the NARD when he represented our Association at that meeting on October 6-8, 1957.

12. Report of Testimonial Dinner for Dr. H. A. B. Dunning.

President Rowe represented the Association and presented the best wishes of the members to Dr. H. A. B. Dunning on the occasion of his eightieth birthday celebration in Baltimore.

13. Woodrow Wilson Teaching Fellowships.

President Rowe investigated the eligibility of teachers of pharmacy for consideration for awards under this fellowship plan and reported that the specifications could not be interpreted as to include teachers in pharmaceutical subjects.

14. Resolutions from the NABP.

The resolutions as received from Secretary Costello of the NABP are as follows:

"*Be it resolved,* by the National Association of Boards of Pharmacy, that it extend hearty commendation to the American Association of Colleges of Pharmacy upon its well planned, carefully directed, and comprehensive recruitment program, and

"*Be it further resolved,* that all National Association of Boards of Pharmacy member Boards be urged to cooperate to the fullest extent possible with the American Association of Colleges of Pharmacy in this farsighted and statesmanlike approach to the manpower needs of pharmacy not only in the present but in the years ahead."

15. Invitations from Host Schools for Teachers' Seminar on Pharmaceutical Chemistry.

Invitations were considered from five member colleges who wished to act as host for the 1958 Seminar. The Executive Committee voted to accept the invitation of the College of Pharmacy, University of Minnesota. The preferred dates were July 13-19 or July 20-26, 1958, at the convenience of the host. Preliminary announcement will be made by the Chairman of the Executive Committee.

Consideration was given to a recommendation coming from a member of the planning committee for the 1957 Seminar and, as a result, the Chairman announced that the Seminar Committee would consist of the dean of the host college as Chairman, one member of his faculty in the subject-matter field, two experts in the subject-matter field from outside the faculty of the host college, and the Secretary-Treasurer of the Association.

16. Recruitment Efforts of the NACDS.

The Secretary informed the Committee of a request from Secretary Willingham of the National Association of Chain Drug Stores for cooperation in evaluating the effectiveness of the advertisement sponsored by its members offering help and information to any young persons interested in pharmacy as a career. They wished advice on how to determine if this recruiting effort had resulted in a sufficient number of responses to be repeated, modified, or changed to another type of effort. The Executive Committee authorized the Secretary to assist them and gave its permission for the NACDS Secretary to submit a questionnaire to the deans of member colleges.

17. Fourth Pan-American Congress of Pharmacy and Biochemistry.

Dean Hewitt, Chairman of the Program Committee of the Congress, reported on the final arrangements and the nature of the program. A successful meeting was anticipated.

18. AACP Representative on the Policy Committee of the A.Ph.A. Division of Hospital Pharmacy.

Several letters have been exchanged between the officers of the Executive Committee and the Secretary of the A.Ph.A. on this matter. The Executive Committee is concerned over the lack of participation of a representative of this Association in the discussions of the Policy Committee. In view of the Policy Committee's pronouncements on education for degrees in pharmacy with a major in hospital pharmacy, it seems desirable to have the active participation of a representative of the AACP on this Policy Committee. This matter was called to the attention of both the AACP and the A.Ph.A. by a resolution originating in and approved by the American Society of Hospital Pharmacists.

19. AACP Representative at the Remington Medal Presentation Dinner.

Dean Hewitt was appointed as the representative of the Association for this occasion. The Secretary was directed to send a congratulatory message to Dr. W. Paul Briggs to reach him on the occasion of the presentation of the medal.

20. Items for Discussion with the American Council on Pharmaceutical Education at the January Joint Meeting.

The chief item for discussion will be the proposed revised standards for accreditation.

The Secretary was directed to review the former actions of the Association and the Council regarding the use of summer sessions for decreasing the total time required for graduation and regarding the accreditation of classes held at night. If, in the judgment of the Association officers, new action should be taken on these matters, such action might be proposed for joint discussion.

21. Resolution No. 2 (1957) Financial Needs of the Committee on Graduate Education.

The Secretary reported the receipt and acknowledgement of a contribution of $1000 from the Smith, Kline and French Foundation for the use of this committee. There seemed to be no need for further financial help until this fund is used.

22. Resolution No. 5 (1957) A Central Depository for Audio-Visual Aids.

The responsibility for an investigation of possible activation of this resolution was placed with the Secretary. He, in turn, has asked the Chairman of the Committee on Audio-Visual Aids to explore the sources of implementation which the Secretary had in mind. The Chairman will report on his efforts at the Annual Meeting.

23. Budget for the Association for 1957-58.

The Secretary had submitted a tentative budget at the post-convention meeting in New York. A few modifications were necessary, and the firm estimate was presented and approved at this time.

24. Policy for Association Participation in Contests and Scholarships.

It was moved, Rowe-Hewitt: It is the policy of the Executive Committee of the AACP that participation in sponsored contests relating to scholarships, fellowships, or prizes by officers of the Association is a participation by the individual and does not imply sanction by the Executive Committee or the Association unless specific approval is sought and received. The motion was passed.

25. Application of Hampden College of Pharmacy for Associate Membership.

Chairman Zopf had appointed a subcommittee composed of Dean Foote and Dr. Harris to examine the application of Hampden College of Pharmacy and report to the Executive Committee. The subcommittee reported as follows:

"The application for Associate membership along with the Bulletin of Hampden College of Pharmacy was carefully studied. It is our considered opinion that the faculty of Hampden College of Pharmacy does not meet the minimum standards for a modern college of pharmacy.

"It is recommended that the application from Hampden College of Pharmacy for Associate membership be denied at this time."

It was moved, Foote-Rowe, that the report of the subcommittee be adopted. The motion was passed.

26. Memorial Statement on the Death of Dr. Rufus A. Lyman.

A subcommittee composed of Dean Hewett and Editor Gibson had been appointed by the chairman on November 1 to draft a memorial to Dr. Rufus A. Lyman. The memorial which was read and approved appears as an addendum to these minutes.

27. Resolution No. 31 (1957). Exploration of Financial Aid to Support Comprehensive Study of Continuation Studies.

The Executive Committee is aware of the need for planning continuation courses. After much discussion regarding the nature of any appeal for funds to support this branch of education, it was the consensus that more details of the program and a closer estimate of costs would be needed before a request could be prepared. The committee in charge of this matter was deemed the most able to provide this information. The matter was directed to be referred to the Chairman of the Committee.

28. Representative to the National Drug Trade Conference.

Dean E. Emerson Leuallen was elected as the Association's representative to succeed Dean Linwood F. Tice on the expiration of his term in 1958. The term of Dean Leuallen is to end in 1961.

29. Planning of Seminar Programs.

After discussion of several suggestions, *it was moved,* Hewitt-Harris, that the appropriate section of the Conference of Teachers of the AACP be asked to submit suggestions for the program for the Seminar which is scheduled for the following year, e.g., the Conference of Teachers of Biological Sciences be asked to concern themselves in 1958 with the Teachers' Seminar in Pharmacognosy to be held in 1959. The motion was passed. The Secretary was directed to send a copy of this action to the secretary of each section of the Conference of Teachers.

30. Topics for Discussion at District Meetings.

The Chairman was instructed to resume the practice of collecting and transmitting topics for discussion at district meetings of boards and colleges.

31. Status of the Committee on Status of Pharmacists in the Government Service.

Dr. Harris reported on the activities of this joint committee during the past months. He presented a summary of opportunities for pharmacists in the government services which had been prepared by the AACP members of the Joint Committee. He was directed to duplicate and distribute the summary to the deans of member colleges.

32. Adjournment.

The Executive Committee adjourned its Interim Meeting at 12:30 P.M., November 2, 1957.

George L. Webster, Secretary

SPECIAL ADDENDUM TO THE MINUTES OF THE EXECUTIVE COMMITTEE

The Executive Committee of the AACP in session in Washington, D.C., 1957, stood for a moment of silent prayer in memory of Dr. Rufus A. Lyman. And for the first time in over twenty years it began its meeting without a man who had given almost a lifetime of devotion to pharmaceutical education—a selfless dedication to the betterment of a profession which was his by adoption. The Committee has lost a valuable link with the past in Dr. Lyman's death. But it can be heartened by the realization that pharmaceutical education was advanced by his being a part of it, and its future will be greater by his challenge to those still living. Dr. Lyman needs no other memorial. The status of pharmaceutical education, which he helped to mold, is living proof of a life well lived.

We, the Executive Committee, wish to express to Mrs. Rufus A. Lyman and members of the family our tribute to our late friend and colleague.

PRESIDENT'S SECTION . . . . . .

Enrollment figures for colleges of pharmacy recently released by Chairman Zopf show our over-all enrollment to be below what it was last year. While some schools showed an increase, a large number of them had a decrease. In view of enrollment increases in universities and colleges in general, the decrease for pharmacy poses quite a problem. The seriousness of this problem becomes more evident if we check enrollment figures back a few years. In 1949-1950 the peak of the veterans' registration was reached. That year also saw the peak of pharmacy enrollment, which has not been reached in any year since then. Yet for colleges and universities in general, the 1949-1950 enrollment has been exceeded every year since 1953. Last year the figures showed that all-college enrollment was 20 per cent *above* the 1949-1950 peak. Pharmacy enrollment was 17.5 per cent *below* the peak. We have then, in comparison to the over-all enrollment, been losing ground each year, even though our enrollments in recent years have shown slight increases. In other words, we are failing to get our share of the larger number of students who have been entering colleges and universities during the past four years.

Why is this happening? There is no single easy answer, but there are a number of factors involved. One is that students are not entering science fields to the extent they did in the past. The enrollment in chemistry at many institutions has not been increasing as rapidly as in nonscience fields or in engineering. We're all familiar, too, with the many articles written on the lack of interest on the part of high school students in science. No doubt this situation is a contributing factor to our lag in enrollment.

Another important factor is the tremendous recruitment drives put on by engineering and to a lesser extent by other fields. These campaigns have been effective, and we have without question lost many students to other areas.

A third, and I believe most important, factor, however, is our lack of a strong recruitment program either on the local or national level. The AACP through its Committee on Recruitment Aids has made available the basic tools for good programs, but the materials provided have not been used effectively in most areas. Before we blame the retail pharmacists for their lack of interest, let's look at our own house and see what the colleges are doing. Does your pharmacy school have an active, hard-hitting program, reaching most of the high schools and junior colleges in your area? For the majority of our colleges, I imagine the answer is no. All of us are doing a little, but few are doing enough. How many of us have actively encouraged our alumni, for example, and other practicing pharmacists to assist us? Probably only a few colleges have done this to any appreciable extent. Perhaps this year's figures will stimulate more of us to put greater effort in this work.

I do not think we have been entirely complacent, but I do think we figured to get, more or less automatically, a larger proportionate share of the increasing numbers attending college. I believe our experiences of the past few years have shown this type of thinking to be wrong. We can get our fair share, but only by extra hard work by each and every college, and by each faculty member of these institutions.

At a recent district meeting a high school counselor presented the "facts of life" as far as his school was concerned. The school was a comparatively new one, and at the time of the counselor's talk, had graduated three classes of approximately 250 students each. Of these 750 students, not one had gone into pharmacy. What is even more unfortunate, until this year, no one had contacted the school about pharmacy. The counselors did not know there were areas in the profession other than retail pharmacy. And their conception of retail pharmacy was one that would not encourage any student to enter this field. I think this situation is fairly typical of what exists in many high schools throughout the country.

It's a difficult job to know how to reach high school counselors effectively. As we all know, there is considerable effort being made by some national organizations and some pharmaceutical manufacturers to help interest high school students in pharmacy. These campaigns will be helpful but will not be the complete answer.

Whether we like it or not, we're in a highly competitive market, and the competition must be met. Even with assistance from organizations and companies, the bulk of the work must be done by the colleges. I think every college, if it hasn't already done so, should review its recruitment program and see how it can be improved.

If we have seventy-four programs continuing year after year, we're bound to make an impact on high school students, counselors, and junior college personnel. The combined all-out effort of all our colleges will produce better results for all concerned than will half-hearted efforts by a scattered few. This problem of recruitment of qualified students is one of the biggest challenges we have faced in years—I am confident we will meet it successfully.

Tom D. Rowe

Pharmaceutical education in this university has been fortunate in an unbroken leadership of nearly half a century. That leadership was courageous. That leadership had a vision. It is your most priceless heritage. Maintain that vision, for without vision a profession, like a people, will perish.

Rufus A. Lyman, Am. J. Pharm. Ed., 2, 385 (1938)

EDITORIAL

Not long ago I was sitting in a restaurant with two alumni of the class of 1950, and one of them turned to me and said, "Dr. Gibson, I have a college degree, but I'm uneducated." We went on to discuss why he thought he was uneducated. As a successful pharmacist he found himself in a community where his social life brought him into association with many other professional people. His background adequately prepared him to be on equal terms with these people as far as social amenities were concerned: he could play golf well, he could play bridge well, but in conversation beyond the banalities of the weather, he found himself woefully lacking. He *was* uneducated.

The critics of pharmacy propose many reasons why pharmacy isn't what they think it should be. I wonder if one might not simply say, "Pharmacy is what it is because pharmacists are uneducated." Whereas my young friend seemed to be interested primarily in "being educated" so that he would be able to integrate with his friends, I think he recognized in himself the inadequate cultivation of his mind and sensibilities—the need for a liberal education.

David Hume's "An Enquiry Concerning Human Understanding" says in part:

> Man is a reasonable being; and as such receives from science his proper food and nourishment: But so narrow are the bounds of human understanding, that little satisfaction can be hoped for in this particular, either from the extent of security or his acquisitions. Man is a sociable, no less than a reasonable being: But neither can he always enjoy company agreeable and amusing, or preserve the proper relish for them. Man is also an active being; and from that disposition, as well as from the various necessities of human life, must submit to business and occupation: But the mind requires some relaxation, and cannot always support its bent to care and industry. It seems, then, that nature has pointed out a mixed kind of life as most suitable to the human race, and secretly admonished them to allow none of these biasses to *draw* too much, so as to incapacitate them for other occupations and entertainments.

With the extension of the pharmacy curriculum from four to five years we have committed ourselves to do something about the uneducated state of the pharmacist, but merely expanding the time spent in college will not assure our making educated men and women out of pharmacy students. It is our responsibility to see that our students have the curriculum to develop themselves to the extent of their abilities and proclivities. In developing the curriculum in the area of general education, pharmacy faculties should call upon the liberal educationists for advice. We need a step-by-step program of courses, not a grab bag offering of unrelated entities. Possibly we may bring about, in the process, a mutual realization between liberal educationists and ourselves of common values in all studies and formulate a program which has purpose and therefore standards. Such a program will be an intellectual experience and an adventure in learning.

I have made a list of seven objectives of such a program. The program will never succeed in accomplishing all of them, but if it lays the foundation for at least some of these things, it will be better than what we have.

1. *Desire to learn.* The new program should foster habits of independent reading and study and encourage reflective meditation, rather than intense memorization. There should be a recognition that education is not merely a practical experience with a specific purpose, but learning for learning's sake and attainment of knowledge for the sake of wisdom.

2. *Imagination.* In so far as it is possible within his inherent limitations, man should be capable of critical and creative thinking and of seeing and solving a problem. For a man may know all the rules of grammar without the capability of writing a coherent paragraph. Georg Hegel says that:

> . . . education consists in possessing not simply a multiplicity of ideas and facts, but also a flexibility and rapidity of mind, ability to pass from one idea to another, to grasp complex and general relations, and so on.

3. *Sensitivity.* The courses not necessary for adjustment or success should be included, those which promote the ability to appreciate the accomplishments of the mind and soul, rather than just the easy comforts of the body.

4. *Responsibility.* In addition to technical training, pharmacists have the same political and human duties of all men to prepare themselves for a useful place in society.

5. *Stability.* Through broad understanding will come an appreciation of the fundamental goals of life and the requirements to obtain them.

6. *Leadership.* As professional men in a community, pharmacists will have leadership thrust upon them. With stability and self-confidence they must combine the abilities to communicate—to speak, to write. They must also be able to listen and to read critically.

7. *Reasoning power.* As imagination is needed in seeing and solving problems, so is reasoning power. But in reasoning, the pharmacist also must be able to develop a sense of values and to understand his fellow man.

These experiences might all be summed up as "the enrichment of the mind and the formation of character." Or as Spinoza better phrased it:

> There is no life therefore without intelligence, and things are good only in so far as they assist man to enjoy that life of the mind which is determined by intelligence.

Broadening the cultural base upon which pharmaceutical education is to stand brings added responsibilities to pharmaceutical educators, many of whom are incapable of meeting the challenge. Many are the products of little general education themselves, and if their interests have not led them into the paths of cultural self-education, they will be ill-prepared to meet the challenge of their students in the future. But, if nothing else, it is hoped that *all* pharmaceutical educators, while struggling to keep their students abreast of the latest developments in the pharmaceutical sciences, will not neglect the communication of basic, historic, and philosophical foundations of the disciplines they teach. Students not only must know what is current, but must be able to view what is current in a broad perspective—through thought which must often be stimulated by teachers. The live, squalling baby of a drug today, requiring much attention, possibly becomes the quiet, semi-retired member of the drug society tomorrow. Its existence does have a place in society, but its value will be judged over a period of years of testing and observation. The students of the future who have been stimulated to imagine and to reason will find it less easy to accept information as a closed body of facts. There will be a synthesis of information and learning. And the role of the pharmaceutical educator will be more as Socrates described his own teaching:

> . . . a midwife assisting the labor of the mind in bringing knowledge and wisdom to birth and thoroughly examining whether the thought which the mind . . . brings forth is a false idol or a noble and true birth.

The problem of stimulating students to appreciate a more liberal education would be relatively easy to solve if reality were as Samuel Johnson viewed it. Boswell wrote:

> 'What would you give, my lad, to know about the Argonauts?' 'Sir, (said the boy), I would give what I have.' Johnson was much pleased with this answer, and we gave him double fare. Dr. Johnson then turning to me, 'Sir, (said he) a desire of knowledge is the natural feeling of mankind; and every human being, whose mind is not debauched will be willing to give all that he has to get knowledge.'

But one is inclined to find students somewhat as described by Donald Harkness (*The Journal of Higher Education,* December, 1957):

> Do most college students really want an education? With some reason our answer may be "NO"! A degree, as the *sine qua non* of lucrative employment, exercises its magic attraction without illuminating the not necessarily lucrative but humanly desirable growth which should take place during the four or five years devoted to its pursuit. Hence, there is a strong student emphasis on the "cash value" of particular courses as they occur in orderly sequence on the path to that degree.

I'm sure we all have seen too many pharmacy students who think of college as purely a functional channel toward economic success. Their attitude is not surprising. Alexis de Tocqueville wrote:

> Men who live in democratic communities not only seldom indulge in meditation, but they naturally entertain very little esteem for it. . . . To minds thus predisposed, every new method which leads by a shorter road to wealth, every machine which spares labor, every instrument which diminishes the cost of production, every discovery which facilitates pleasures or augments them, seems to be the grandest effort of the human intellect. . . . In the present age the human mind must be coerced into theoretical studies; it runs of its own accord to practical applications; and instead of perpetually referring it to the minute examination of secondary effects, it is well to divert it from them sometimes, in order to raise it up to the contemplation of primary causes.

But this lack of interest in anything that does not bring material gain is probably a logical development in a country born of a need for materialism and nutured on the importance of doing *something,* but sometimes withering of too little ***serious thinking.*** Whether this thinking in our present students evolves from lack of proper basic training in the schools or in the home is a question worth considering, but not within the scope of this editorial. There are many sign posts which indicate, however, something must be done for the whole man, whether he be a pharmacy student or not. From the Archbishop of Canterbury's Fifth Committee:

> A nation which regards education primarily as a means of converting its members into more efficient instruments of production is likely not only to discover that by such methods it cannot attain even the limited success at which it aims.

A more direct and startling report sponsored by the Fund for the Advancement of Education by John Hollenbach and Clarence de Graaf (*The Journal of Higher Education,* March, 1957) warns:

> . . . many students in Hope College classes are inept or at times completely lacking in their ability to attack questions and problems which require them to take several steps in order to arrive at a reasonable answer or judgment. For example, they do not discern relationships, or they draw hasty or invalid conclusions about the relationships between events or objects. Secondly, many students are at times unwilling or emotionally unready to think rationally and soundly. They are prone to accept gen-

> eralizations of others in a completely uncritical way or to be stubbornly unwilling to accept the conclusions indicated by strong evidence. . . one of the critical functions of a college program, and thus of the college staff, is to help students become more rationally reflective and more inclined to use the principles of logic and the techniques of problem solving in facing the varied problems of modern living.

Pharmaceutical educators must assume the responsibility of impressing upon their students that college cannot teach them all they need to know to practice pharmacy, but can give them only the tools with which to work, and these tools must be more than facts; they must be the ability to use the facts for the good of all. Back in 1829 the Yale faculty declared:

> There are many things important which are not taught in colleges because they may be learned anywhere.

Our responsibility as educators to strengthen general education in the pharmaceutical curriculum is emphasized by the conclusions reached by Ernest Green in *Adult Education—Why This Apathy?* Mr. Green states that adult education must start in the school; the desire for liberal education is either stimulated or stifled by the time of leaving school. William James wrote over a half century ago:

> Compare the accomplished gentleman with the poor artisan or tradesman of a city: during the adolescence of the former, objects appropriate to his growing interest, bodily and mental, were offered as fast as the interests awoke, and as a consequence, he is armed and equipped at every angle to meet the world. Sport came to the rescue and completed his education where real things were lacking. He has tasted of the essence of every side of human life, being sailor, hunter, athlete, scholar, fighter, talker, dandy, man of affairs, etc., all in one. Over the city poor boy's youth no such golden opportunities were hung, and in his manhood no desires for most of them exist.

And just as the young alumnus's voice is still ringing in my ear, "I am uneducated," it might be well to note Plato's admonition to any educator:

> . . . and with a true taste while he praises and rejoices and receives into his soul the good, and becomes noble and good, he will justly blame and hate the bad, now in the day of his youth, even before he is able to know the reason why; and when reason comes he will recognize and salute the friend with whom his education has made him long familiar.

It is up to us to enkindle within the students the realization of the importance of a liberal education background and to see that the requirements are not just tolerated as academic eccentricities. These students must be made to realize that education is more than simple competence in the discipline or concern for subjects of transient relevance. Education should be presented as an improvement of the individual; students need to be shown that they must have the mental background to accommodate themselves to the inevitable changes in the practice of pharmacy and the character of the society in which they live. These will be our responsibilities—yours and mine—in meeting the challenge and purpose of an extended pharmacy program.

Melvin R. Gibson

DR. LYMAN COMMENTS . . . . . .

Editor's Note: The following editorial was written by Dr. Lyman a few days prior to his death and was submitted for publication by his daughter, Mrs. Louise Lacy, as his last contribution to the journal he founded, and edited for nineteen years.

> There is none who questions that the hope of the world lies in education, and yet we have come to take education for granted, not easily realizing that there are threats to freedom of education in our current system. It has been properly stated that vigilance in the matter of educational freedom is more vital to us and our way of life than freedom of enterprise because that which threatens educational freedom threatens all freedom.
>
> Our complacency about education descends from a long and notable history of public schooling, and the paternalism of our national government for the past quarter of a century has lulled us into an inability to distinguish between local support and federal support of most of the things we want, including education. Centralized government is bad—centralized education is terrifying.
>
> Under these circumstances it is enigmatic that we fail to grasp the need for extending local support to education from primary schools to colleges. Costs of operation of schools have risen in proportion to costs of everything else, except the taxes that go to education. We have to be willing to make greater contributions, individually and locally, to our educational institutions.

These lines were written by Walter Cousins, Jr., the erudite editor of the *Southern Pharmaceutical Journal* and the son of the late distinguished and lovable Walter Cousins, Sr., of Texas pharmaceutical fame. They appeared in an editorial under the title, "Dollar-a-Week-Philanthropists," in the February, 1957, number of the *Southern Journal*.

Editor Cousins did not stop with the above quotation. He calls attention to the fact that every profession, every line of business, every industry, and even labor is struggling for better-trained manpower and for more power that can be better trained. Pharmacy is in that competing group. He points out that colleges of pharmacy have gone their limit in giving free scholarships and increasing tuition, but education must not be thwarted by raising tuition costs out of reach of struggling youth. He stresses the point that the time has come when the practicing pharmacist must assume a high degree of responsibility for the maintaining of our educational institutions. Pharmacy is not alone in this respect, for the medical profession has been struggling with the problem of maintaining the high standard of medical education for years, and the profession has established a national foundation for the express purpose of obtaining financial support for medical education from the rank and file of medical practitioners.

Editor Cousins states that: "Money must come for the sustenance of pharmacy colleges from those who have been benefited by pharmacy. Pharmacy's future was never brighter—nor has its responsibilities to the public as part of the health team ever required more and better trained people. Those who cry for manpower should be the first to recognize the need for supporting the source of that manpower." He also calls attention to the fact that pharmacy as a

profession probably pays less for its privileges than any other profession. Dues and fees of the practicing pharmacist probably do not exceed fifty dollars a year while many other professions and trades double or more than double that figure.

But Editor Cousins is not content simply to call our attention to the needs of pharmaceutical education. He has done something about it. In his own bailiwick he has established the "Society of Dollar-a-Week Philanthropists." Any funds contributed will be used to supplement the needs of the college the donor may designate.

Pharmacy is most fortunate in having the American Foundation for Pharmaceutical Education which has done a remarkable service in supplying funds for the improvement of teaching. The funds contributed by the Foundation come largely from the pharmaceutical industry. They are used largely in support of scholarships and for fellowships for graduate students in the pharmaceutical disciplines in order to increase the efficiency of pharmaceutical teaching. This of course is getting down to feeding the grassroots of pharmaceutical education, down where the nourishment is most needed and where it will return the greatest dividends.

But the Foundation funds are not sufficient to supply all the needs of the colleges. Money is needed for the development of libraries, for establishing and equipping and maintaining laboratories and other physical equipment which may be required as the work of the institutions expands and greater demands are made upon them.

It is characteristic of human beings to want to know where their money is going and what it is to be used for when they give it. Most human beings like to make contributions to their local institutions first, and Editor Cousins has cut a pattern that makes this possible. There is no institution teaching pharmacy whose efficiency and usefulness could not be improved and extended if greater financial support was provided.

In the writer's Comments in the Summer number of the *Journal*, he said it was a wholesome situation when the pharmaceutical press takes an interest in pharmaceutical education. The problem under discussion was the best place for the location of a college of pharmacy. It is even more important, when that press brings forth a plan to give financial support to the colleges of pharmacy by the rank and file of practitioners of pharmacy. What pharmaceutical education most needs is the moral and financial support of everyone in the practicing profession. Think what such support would mean to the American Foundation for Pharmaceutical Education and the prestige it would give pharmacy in public circles. It is true that in legislative halls and in university administration, help comes in greater quantities from the outside to those who help themselves.

All worthwhile movements start with one man or a small group of men and women. Editor Cousins has set an example in Texas that we all would do well to follow. He speaks the truth when he says:

> For much less than the price of a package of cigarettes each day, a pharmacist could be a great benefactor to research development and education. Dollar-a-week philanthropy can guarantee the hope and trust which humanity places in pharmacy to continue to find ways and means to eliminate illness and disease. Whatever pharmacy is today stems from the laboratories of educated people subsidized by the unselfish providers of funds.

Rufus A. Lyman

ANNOUNCEMENTS . . . . . .

Instructions to Authors. Manuscripts submitted to the Editor, reports to be published, and articles presented to the sections of the Conference of Teachers should conform to standard specifications. All material submitted for publication should be prepared in a manner that eliminates undue editorial changes. Material must be typewritten with double spacing on one side of paper 8.5" x 11" in size and with 1" to 1.5" margins, and submitted in original and one carbon. All pages should be numbered consecutively.

For all material, except reports of committees, delegates, and officers, the title on the first page should be followed by the author's name without reference to institution of affiliation, title, or degree. Attached to the article should be a separate sheet of paper which indicates the title of the paper, the author, his position, his highest academic degree, the name of the institution from which he attained this degree, and his major field of interest and/or specialization relating to the content of the article.

Reports of officers, delegates, and committee chairman to be submitted for publication should be headed by the official name of the contributor's office, unit, or committee. The Association name is not necessary in such a heading. At the end and on the last page of the report should appear the name of the officer, delegate, or committee chairman. No biographical information is required for individuals submitting such reports.

In all articles, except reports, center sub-headings must be used when appropriate. These should not be numbered. Literature citations should be numbered immediately following references and should be numbered consecutively in order of appearance in manuscript. These numbers should be full-sized Arabic numerals enclosed in parentheses. Subsequent citations to the same reference should be indicated by the original number assigned. References to footnotes throughout the text should be numbered consecutively by superscript Arabic numerals, but such references in a table should be designated by superscript lower case letters beginning with "a." Literature references should be grouped at the end of the article under the heading "References" and in sequence of appearance in the text. These should be preceded by the appropriate reference numbers in parentheses. The names of all periodicals cited in the list of references must be abbreviated in accordance with abbreviations given by *Chemical Abstracts* in its "List of Periodicals Abstracted." Citations of periodicals and books should follow the form required by the *Scientific Edition, Journal of the American Pharmaceutical Association. Webster's New International Dictionary* is used as the authority for spelling and use of terms. *A Manual of Style* (University of Chicago Press) is the authority for form.

Numbers of less than three digits should be written in words. Numbers of three or more digits should be written in Arabic numerals unless occurring at the beginning of a sentence, in which case the numeral should be spelled out. Periods of time should be written in words. Decimal numbers should always appear in figures as well as all numbers expressing per cent.

The following words should be capitalized: the word *committee* when referring to a specific committee, officer's titles and the word *association* when referring to the American Association of Colleges of Pharmacy and its officers, the name of a specific department of a specific school, and terms *college* and *school* when specific ones are meant. The following words should not be capitalized: areas of study, academic and equivalent titles unless they precede directly the individual's name or are in apposition, class names, and course names.

Film titles should be underlined to indicate printing in italics. Abbreviations of organizations where the abbreviation is all capital letters should not have periods nor spacing (Example: AACP, AFPE, but A.Ph.A.).

Well-prepared glossy photographic prints are accepted in a limited number. The budget of the *Journal* allows in each volume a limited number of cuts which are printed at no cost to the authors. If the *Journal* is not able to include an author's cuts because of budgetary limitations, the author or the institution represented may pay for such cuts to be included.

Authors wishing to retain photoengravings of illustrations or original drawings and photographs must indicate this desire when returning proofs. Engravings, drawings, and photographs for which no requests are received will be destroyed after each issue of the *Journal* is published.

Photographs should be submitted in envelopes properly padded to prevent damage. All figures submitted must be referred to in the text of the manuscript and should be numbered consecutively with Arabic numerals, e.g., Fig. 1, Fig. 2, etc. Titles of figures should be typewritten on separate pieces of paper. Figure numbers corresponding to titles should be *lightly* written in one corner on the back of the prints.

The number of tables submitted should be kept to a minimum. They should be constructed to occupy no more than the width of the page, seventy type-characters and spaces for regular type and eighty-five for reduced type. Committee reports of the Association appearing in the Summer issue will be printed in reduced type. All tables should be referred to in the text of the manuscript at the appropriate point of inclusion, and should be numbered in Roman numerals. The table number and title should be placed in a heading above the table.

The *Journal* maintains a limited staff; hence, all material not conforming to the above specifications will be returned to authors for correction.

Authors should read galley proofs carefully and compare them with the manuscript. All editorial questions, either in the manuscript or proof, should be carefully answered.

In making changes in galley, authors should bear in mind that changing the length of any line will probably necessitate resetting the remainder of the paragraph. A corresponding condensation or addition can often be made to preserve the original length of the line. Excessive changes in proofs will be changed to the author.

Reprints may be obtained at the prices quoted each author when proofs are delivered. Reprints must be ordered when the galley proofs are returned by the author. If reprints are not ordered at that time, it will be understood that no reprints are desired.

The Editor will be glad to answer any questions authors may have concerning the specifications indicated above.

MEMORIALS . . . . . .

RUFUS ASHLEY LYMAN

On October 12, 1957, my father died. Let us not view this event only as our loss, but as a suitable conclusion to a life that had already given to us everything that it could possibly give. His lifetime spanned the period from the disaster of the United States Seventh Cavalry on the Little Bighorn to the occasion of man's first successful effort to penetrate outer space. He lived to see his dream realized not only in brick and in mortar, but in the integrity of a profession, in the spirit of universities, in the soul of his church, and in the character of his students, his children, his grandchildren, and his great grandchildren. He lived to see his words acclaimed and his likeness cast in bronze. He saw his work pass into the hands of dedicated men of proven competence. He tasted of poverty, of sorrow, of prosperity, and of triumph. To the very end he was privileged to enjoy the full use of his body and his intellect. All these are not small things.

Let us not take this occasion for expressing of grief. This is a time to pray that we may be given the opportunity, the vision, and the courage to build as he has built, that we may be rewarded in like measure.

Rufus A. Lyman, Jr.

Dr. Rufus Ashley Lyman, 82, noted leader in pharmaceutical education, passed away suddenly October 12, at his home at 1649 South 21st Street, Lincoln. He was engaged in conversation with members of his family when stricken with a cardiac seizure.

Rufus Ashley Lyman was a native of Table Rock, Nebraska. He held three degrees from the University of Nebraska: Bachelor of Arts, 1897; Master of Arts, 1899; Doctor of Medicine, 1903.

He was appointed to the faculty of the College of Medicine as instructor in physiology and pharmacology in 1904 and served in this capacity until 1908. At that time he was assigned the responsibility for organizing the School of Pharmacy, which had been authorized by the Board of Regents of the University of Nebraska, as a part of the College of Medicine. He served as Director of the School of Pharmacy until 1915, when the College of Pharmacy was established by act of the legislature. Dr. Lyman was named as dean of the new college, and served in this capacity until his retirement as Dean Emeritus in 1946. He also established the Student Health Service at the University of Nebraska in 1919 and served as its director until 1945.

In 1947, Dr. Lyman was called to the University of Arizona at Tucson to establish a school of pharmacy. He served as its director until 1949, when it was reorganized by legislative action and he was named as its first dean, serving in this capacity during the year 1949-50.

Upon completion of this year of service, he was named as Dean Emeritus of the College of Pharmacy of the University of Arizona, and thereby became the only person to hold this title from two separate schools of pharmacy.

During his lengthy period of service, Dr. Lyman occupied a preeminent position as a leader in pharmacy. His influence upon the elevation of standards and the improvement of pharmaceutical education earned world-wide recognition.

Early in his career in his adopted profession, Dean Lyman became active in the program of the American Conference of Pharmaceutical Faculties, the predecessor of the American Association of Colleges of Pharmacy. He served as Vice President in 1915-16, as President in 1916-17, and as Chairman of the Executive Committee from 1920 to 1923, and continued to serve as a member of the Executive Committee for a number of years. When the *American Journal of Pharmaceutical Education* was established in January of 1937, Dr. Lyman was named as the Editor. His position in this office gave him continuous membership on the Executive Committee of the AACP. In 1955, when he retired as Editor, he was retained in the capacity of Consulting Editor. In 1955 the American Association of Colleges of Pharmacy, by unanimous vote, elected Dr. Lyman to honorary membership. This is a recognition which has been accorded to only one other person, Miss Zada M. Cooper, who served the Association so faithfully and efficiently for twenty years (1922-1942) as its secretary.

For many years Dean Lyman served as the chairman of the Committee on Problems and Plans of the American Association of Colleges of Pharmacy, which for the most part is made up of younger teachers of the pharmaceutical sciences. A major portion of the achievements and activities of this association during the past decade has been based upon ideas and programs developed by this committee.

Perhaps Dr. Lyman's most significant contribution to pharmaceutical education, when considered from the standpoint of molding opinion and enlisting support for the elevation of standards, has been made through his editorship of the *American Journal of Pharmaceutical Education*.

In 1942, when the J. B. Lippincott Company was seeking someone capable of serving as Editor-in-Chief of a series of modern textbooks in the various areas of pharmacy, a survey among the leading educators in this field resulted in the selection of Dr. Lyman for this assignment. Under his supervision, a whole series of modern textbooks have been published, and several of these are now in the second or third editions.

Dr. Lyman has received many honors and recognitions. Among these is the Remington Medal, the highest honor in the field of pharmacy, which was awarded in 1947 for distinguished pharmaceutical service. He was Honorary President of the American Pharmaceutical Association in 1952-53 (the Association's centennial year). In 1955 he was made Honorary Founder of Kappa Epsilon (professional sorority for women pharmacy students). He held honorary membership in the United Provinces Pharmaceutical Association of India.

At the time of his death, Dr. Lyman was eagerly anticipating his attendance at the meeting of the Fourth Pan-American Congress of Pharmacy and Biochemistry to be held in Washington, D.C., November 3-9.

Lyman Hall, a new and modern building named in his honor, is almost completed. It is a matter of keen regret to the alumni of the College of Pharmacy of the University of Nebraska, that the founder and first Dean of the College did not live to see this building dedicated and occupied, events which are scheduled for June of 1958.

Surviving Dr. Lyman are his widow, Mrs. Carrie D. Lyman, and five of their six children. Caroline, the second daughter, died August 25, 1927. The

surviving sons and daughters are, in the order of their ages: Mrs. Wilbur Knight (Esther), Long Beach, California. The Knights have six children and three grandchildren. Mrs. John A. Vankat (Betty) Eau Claire, Wisconsin. The Vankats have four children. Mrs. Louise Lacy, Lincoln, Nebraska, whose husband died several years ago. She has two children. Dr. Rufus A. Lyman, Jr., Director of Student Health and Chairman of the Department of Zoology, Idaho State College, Pocatello. There are three children in this family. Dr. Edwin D. Lyman, Director, Omaha-Douglas County Health Department, Omaha, Nebraska. There are two children in this family.

An outstanding leader in pharmaceutical education has passed from our midst. Although he will be greatly missed, his influence will live on after him. Dr. Lyman had a full and rewarding life. Seldom has anyone lived to see so many of his hopes and objectives realized. His life and leadership will be a lasting inspiration to all who follow in his footsteps. The keynote to his life and works is embodied in his favorite quotation from Proverbs—"Where there is no vision, the people perish."

Joseph B. Burt

He loved many and was loved by many.
He had a mission and fulfilled it.
His monument is pharmacy.

Melvin R. Gibson

EDWARD SPEASE

Edward Spease was born at Dresden, Muskingum County, Ohio, on March 31, 1883. He passed away on October 12, 1957, at the Akron City Hospital. Following a stroke last March, he recovered sufficiently to be about home until the end of the summer when he suffered a more severe attack from which he never recovered.

Mr. Spease's first two years' experience as an apprentice were with John Hornung, pharmacist, Dresden, Ohio, 1901 and 1902. He entered the Ohio State University, School of Pharmacy in the fall of 1903 and was graduated with the Ph.C. degree in 1905 and the B.S. degree in 1907. He was granted an honorary Master of Pharmacy degree in 1936 by the Philadelphia College of Pharmacy and Science in recognition of his work to establish hospital pharmacy courses and to give practical training in that field of service. He became a registered pharmacist by examination in 1905. For many years thereafter he worked in a number of Ohio drugstores during the summers and as a relief pharmacist at other times.

Upon his graduation in 1907 Mr. Spease became an assistant in the College of Pharmacy, Ohio State University, and was advanced to the position of assistant professor of pharmacy and secretary of the College until 1916, at which time he resigned to become Dean and Professor of Pharmacy, Western Reserve University, Cleveland, Ohio. He was married to Alice Kelly of Pittsburgh, Pennsylvania, June 22, 1911.

An outstanding contribution to the progress of professional pharmacy was made by Edward Spease during his twenty-four years as Dean of Pharmacy at Western Reserve University. He was Directing Pharmacist of University Hospitals of Cleveland 1932-1940. Through his efforts a written agreement was

made between Western Reserve University and the University Hospitals of Cleveland whereby the professor of pharmacy in the University became Directing Pharmacist of the hospitals and the pharmacists in the hospitals were elected to the Pharmacy School faculty.

To aid in carrying out this program a Pharmacy Committee was organized consisting of the Directing Pharmacist and one representative from each of the departments of medicine, surgery, pediatrics, and obstetrics and gynecology. The Chief Pharmacist was the secretary of this committee. This committee was in charge of all medications and professional supplies and created a Drug Policy and a Professional Stores Policy. It also made it possible for pharmacist internes to reside with the medical internes. Through the cooperation of the Pharmacy Committee, Dean Spease gave the first graduate instruction in hospital pharmacy. This made him a member of the Graduate School Faculty of Western Reserve University, 1937-1940. In 1940 there were thirteen graduate students in Hospital Pharmacy at Western Reserve. Furthermore, undergraduate instruction in hospital pharmacy was given to all students in the junior year and to a chosen list of senior students. During this period, articles of cooperation between the Academy of Pharmacy and the Academy of Medicine of Cleveland were agreed on, printed and circulated. He may well be called the "father of hospital pharmacy."

Dean Spease was president of the American Association of Colleges of Pharmacy, 1927-1828; one-time Secretary, Editor, and President of the Phi Delta Chi Fraternity, and honorary member of Kappa Psi, and of Rho Chi. He was a life member of the American Pharmaceutical Association and the Ohio State Pharmaceutical Association. In 1920-1921 he was chairman of the Section on Education and Legislation of the American Pharmaceutical Association and served for many years as chairman of the Legislative Committee of the Ohio State Pharmaceutical Association. He was joint author of the Ohio Prerequisite Law. He was a Fellow of the AAAS; and held membership in the American Chemical Society; American Public Health Association; associate member of the Cleveland Academy of Medicine; associate member of the Cleveland Medical Library; honorary member of the Northern Ohio Druggists' Association; member of the Cleveland Academy of Pharmacy; member of the American Society of Hospital Pharmacists, and received the Whitney award in 1952. He was also a member of the Ohio and the Cleveland Societies, and Third Vice President of the United States Pharmacopoeial Convention 1930-1940. He was also listed in *Who's Who in America*, Volume 14, 1926-1927 and later, and at one time in *American Men of Science*.

Dean Spease was co-author of *"Minimum Standards for Hospital Pharmacies*, adopted by the American College of Surgeons in 1936. He was author of *Pharmaceutical Mathematics* and a co-author of the chapter on hospital pharmacy in *Remington's Practice of Pharmacy, Eighth Edition*.

In 1940 Mr. Spease resigned his position as Dean of Pharmacy at Western Reserve University and served as Director of Public Relations, National Association of Retail Druggists from 1940 to 1944. He then retired to Ravenna, Ohio, and continued for a time to be the Science and Prescription Editor of the *NARD Journal*. Later he moved to a three-acre plot outside of Hudson, Ohio, where he and Mrs. Spease lived in retirement. There he enjoyed his yard, trees, and garden. He also kept alert to things pharmaceutic until the fatal illness overtook him.

Those of us who knew Edward Spease well admired him for the forthright character that he was; a man of unquestionable integrity. The pharmaceutical profession will always be indebted to him for his earnest labors and unselfish efforts to improve its educational program and to make pharmaceutical services a cooperative and a necessary feature of the health professions. This is exemplified in the pioneering work he did in the organization of a successful hospital pharmacy program at Western Reserve as a medical and pharmaceutical cooperative educational program.

Mr. Spease is survived by his wife and a brother. Mrs. Spease continues to reside at their home at 12 John Clark Lane, Hudson, Ohio. Memorial services were held for Mr. Spease in Christ Church Episcopal in Hudson at 2:00 p.m. on Saturday, October 19.

C. O. Lee

W. F. SUDRO

W. F. Sudro, Dean of the North Dakota Agricultural College School of Pharmacy from 1926 until his retirement in 1955, died in a hospital at Neenah, Wisconsin, on September 30. Dr. Sudro, who had been in failing health for some time, had gone to Neenah to live with his daughter, Mrs. R. Clifford Brown, after having spent the summer at his lake home. On his arrival in Neenah he entered the hospital, where he died one month later.

Born at Elyria, Ohio, on November 15, 1884, Dr. Sudro attended school there and, following his graduation from high school, entered the pre-medical school at the University of Illinois. A year and a half later he transferred to the University of Michigan where he received a B.S. degree in 1906. In 1918 he received an M.S. degree from the University of Wisconsin.

He came to Fargo in 1907 as an instructor at NDAC and also filled the post of assistant chemist in the food and drug commissioner's office. He was connected with the department when the first state beverage law requiring that all beverages be registered by the state food commissioner was enacted. The work was done by the department, and Dr. Sudro assisted in analyzing practically every beverage then on the American market. He also developed standards for gasoline and motor oils, and the methods he used later formed the basis of laboratory control on these products.

Not long after becoming associated with NDAC, he was made a full professor. When he first came to the pharmacy school it was a part of the chemistry department, but in 1919 it was made a new school with Dr. Sudro as the head. In 1926, he was appointed Dean .

Active in the North Dakota Pharmaceutical Association, he served as secretary of the organization from 1920 to 1954. He was a member of the Northwest Pharmaceutical Bureau, and beginning in 1929 he was a contributing editor to *North Western Druggist* until his retirement as Dean.

Dr. Sudro was a member of the Presbyterian Church; the Masonic Lodge, York Rites bodies; the Shrine; the North Dakota Academy of Science; American Association of University Professors; Sigma Alpha Epsilon; Phi Kappa Phi; Rho Chi; the Fargo Country Club, and the Commons Club. He was listed in *Who's Who in American Education.*

Mrs. Sudro died in 1952, and his only immediate survivors are two daughters, Mrs. R. Clifford (Jane) Brown, of Neenah, Wisconsin, and Mrs. Erling P. (Deborah) Schranz, of Wausau, Wisconsin.

Clifton E. Miller

NEW LITTLE PEOPLE

Catherine Rodman Reid—born September 3, 1957, to Mr. and Mrs. Jim T. Reid, University of Kansas City.

Gino Anthony Picchioni—born December 4, 1957, to Dr. and Mrs. Albert L. Picchioni, University of Arizona.

Valerie Murray—born November 4, 1957, to Mr. and Mrs. Eugene B. Murray, Brooklyn College of Pharmacy.

Gary Robert Labrecque—born October 26, 1957, to Mr. and Mrs. Joseph L. Labrecque, New England College of Pharmacy.

Jonathan Mark Nichol—born November 15, 1957, to Mr. and Mrs. John Nichol, New England College of Pharmacy.

Suzanne Blaug—born November 2, 1957, to Dr. and Mrs. Seymour M. Blaug, State University of Iowa.

Kathleen Bridget Fay—born to Mr. and Mrs. John T. Fay, Jr., Massachusetts College of Pharmacy.

Marion Joan Krezanoski—born September 30, 1957, to Dr. and Mrs. J. K. Krezanoski, Medical College of Virginia.

Glenda Suzanne Nobles—born October 8, 1957, to Dr. and Mrs. W. Lewis Nobles, University of Mississippi.

Erin Kathleen Sheffield—born November 19, 1957, to Mr. and Mrs. W. J. Sheffield, University of Texas.

Barbara Marie Putney—born October 13, 1957, to Dr. and Mrs. Blake F. Putney, Rutgers—The State University.

Nancy Lee Isaacson—born August 10, 1957, to Mr. and Mrs. Eugene I. Isaacson, University of Minnesota.

Leal Anne Mertes—born September 20, 1957, to Mr. and Mrs. Mathias P. Mertes, Jr., University of Minnesota.

Susan Rose Blockstein—born November 15, 1957, to Mr. and Mrs. William L. Blockstein, University of Pittsburgh.

MARRIAGES

Dr. Eugene A. DeFelice, Professor of Biochemistry, Microbiology and Public Health, New England College of Pharmacy, to Miss Charlene Cecelia Petsch, December 21, 1957.

Dr. Ludwig Bauer, University of Illinois, to Miss Ella Bamberger, October 11, 1957.

Mr. John L. Fischer, University of Illinois, to Miss Maureen Gleason, November 23, 1957.

Mrs. Cecelia H. Niklas, Wayne State University, to Mr. Raymond Turczynski.

Mr. William D. Hardigan, Instructor of Pharmacy, University of Wyoming, to Miss Janet Louise Bader, December 28, 1957.

STAFF CHANGES . . . . . .

NEW STAFF MEMBERS

Ferris Institute. Mr. James Hintz has been appointed instructor of pharmacy. Mr. Hintze received his M.S. degree from Purdue University. Dr. James C. Freck has been appointed associate professor of pharmaceutical chemistry. Dr. Freck was formerly a research chemist with the American Chicle Company and Union Starch Products Company.

University of Tennessee. Mr. Samuel Stubbs has been appointed instructor of pharmacy. Mr. Stubbs received his B.S. degree from the University of Tennessee.

New England College of Pharmacy. Dr. Babu N. Patel has been appointed professor of pharmaceutical chemistry and chairman of the department. Dr. Patel was formerly director of research at E. Fougera & Company.

Massachusetts College of Pharmacy. Dr. Edwin L. Prien has been appointed clinical research associate.

St. John's University. Dr. John J. Sciarra has been appointed assistant professor of pharmaceutical chemistry. Dr. Sciarra received his Ph.D. degree from the University of Maryland.

University of Illinois. Dr. Arthur E. W. Smith has been appointed assistant professor (exchange) in pharmacology.

CHANGES IN STAFF TITLES

University of Arkansas. Dr. Thaddeus Grosicki has been promoted from assistant professor of pharmacy to associate professor. Dr. William A. Strickland has been promoted from assistant professor of pharmacy to associate professor.

Massachusetts College of Pharmacy. Mr. Mitchell J. Stoklosa has been promoted from associate professor of pharmacy to professor. Dr. John W. Schermerhorn has been promoted from assistant professor of pharmacy to associate professor. Mr. James Mickles has been promoted from instructor of chemistry to assistant professor. Mr. Ronald N. Duvall has been promoted from instructor of chemistry to assistant professor. Mr. John T. Fay, Jr., has been promoted from assistant in pharmacy to instructor.

Philadelphia College of Pharmacy and Science. Mr. Kenneth Avis has been promoted from assistant professor of pharmacy to associate professor. Mr. Robert E. Abrams has been promoted from assistant professor of pharmacy to associate professor.

University of Illinois. Dr. George L. Webster was appointed dean of the College of Pharmacy effective January 1, 1958. Dr. Webster's

former title was professor of chemistry and head of the department. Mr. Ralph E. Terry has been promoted from associate professor of pharmacy to professor. Madeline Barnothy has been promoted from assistant professor of physics to associate professor. Mr. Paul Carpenter has been promoted from assistant professor of zoology to associate professor. Dr. Charles W. Clarke has been promoted from assistant professor of chemistry to associate professor. Mr. Herbert Emig has been promoted from assistant professor of pharmacy to associate professor. Dr. Norman R. Joseph has been promoted from assistant professor of chemistry to associate professor. Dr. Charles A. Reed has been promoted from assistant professor of zoology to associate professor. Mr. Bernard H. Gold has been promoted from instructor of sociology and psychology to assistant professor. Mr. Eugene J. Dehner has been promoted from assistant in pharmacy to instructor. Rose Ann Grundman has been promoted from instructor of mathematics to assistant professor.

University of Wyoming. Mr. William David Hardigan has been appointed instructor of pharmacy for the academic year, 1957-58. Mr. Hardigan was supply instructor in pharmacy last year.

University of Pittsburgh. Dr. Joseph A. Bianculli, Professor of Pharmaceutical Chemistry and Chairman of the Department, has been appointed acting dean of the College of Pharmacy.

The possibilities of service by the members of any profession depend upon its educational program and the care which is given to the selection of the men who enter it.

Rufus A. Lyman, Am. J. Pharm. Ed., 5, 116 (1941)

GENERAL NEWS

Webster dean at Illinois. Dr. George L. Webster, Professor of Chemistry and Chairman of the Department of Chemistry, College of Pharmacy, University of Illinois, effective January 1, 1958 was appointed dean of the College of Pharmacy. Dr. Webster is Secretary-Treasurer of the AACP.

Enrollment report. Recently Dean Louis C. Zopf, Chairman of the AACP Executive Committee, released a report on enrollment in schools and colleges of pharmacy for the first semester, term, or quarter, 1957-58. The tabulation included data from the seventy-five member colleges of the AACP in the United States, three nonmember colleges, and the enrollment in the colleges of pharmacy of the University of the Philippines and the University of Puerto Rico. Enrollment reports from all colleges in the United States showed a total of 4,632 new students admitted this year. Certain colleges were unable to report their pre-pharmacy registration since they have students registered on other campuses, and such figures were not available to the reporting pharmacy deans. Eleven colleges did not report freshman classes as of this year. Seventeen of the colleges of pharmacy in the United States are currently on the five or six year programs. All future comparisons of students enrolled in colleges of pharmacy will, of necessity, be based on the last three years of their professional training.

The report showed that a total of 17,247 students are known to be either in pre-pharmacy classes or in colleges of pharmacy. This figure represents a reduction of 221 students from the revised 1956 total of 17,468. There are 3,916 students listed as seniors in colleges of pharmacy in the United States (3,600 four year seniors; 115 five year seniors; and 201 six year seniors). This represents an increase of 143 senior students as compared with the number reported last year (3,773).

McCloskey passes. Dean John F. McCloskey, Loyola University, passed away on December 9 after an extended illness. Dean McCloskey's death leaves vacant the office of Vice President of the AACP. He was to have succeeded to the presidency of the AACP in 1958.

Burt elected. Dean Joseph B. Burt, University of Nebraska, was elected president of the Pan-American Federation of Pharmacy and Biochemistry at the closing session of the Federation held in Washington, D.C., in conjunction with the Fourth Pan-American Congress of Pharmacy and Biochemistry in November.

Burt, Powers, and Lee recognized. On the occasion of the seventy-fifth anniversary of the School of Pharmacy of the University of Wisconsin, the Wisconsin Board of Regents recognized three of its distinguished alumni for their service to pharmacy. The recipients of the citations were Dean Joseph B. Burt, University of Nebraska; Dr. Justin L. Powers, Director of Revision of the *National Formulary* and Editor of the *Scientific Edition, Journal of the American Pharmaceutical Association*; and Mr. Jacob Lee, retail pharmacist, Menomonie, Wisconsin.

Grolle receives degree. Mr. Floyd A. Grolle, head of pharmacy administration at the University of Michigan, recently received the Ph.D. degree from the University of Michigan. His thesis title was "Case Studies in Pharmacy Management." These case histories will be published in the spring in suitable form for use in pharmacy management courses.

Autian receives grant. Dr. John Autian, Assistant Professor, University of Michigan, recently received a $5000 grant from Becton Dickinson and Company to study the effects of certain plastic tubings and syringes on injectible drug products.

Granberg elected. Dr. C. Boyd Granberg, Drake University, was elected to the Drake University Senate as a representative at large from the university faculty.

Burt at Temple. Dean Joseph B. Burt, University of Nebraska, addressed the student body of the School of Pharmacy of Temple University December 5, in his capacity as President of the American Pharmaceutical Association.

Sprowls appointed. Dean Joseph B Sprowls, Temple University, has been appointed a member of the professional education committee of the Philadelphia Division of the American Cancer Society.

St. John's holds fair. More than 200 science students from twenty-five high schools in the metropolitan New York area attended the Pharmacy Fair at St. John's University. The students were accompanied by their faculty advisors. The Fair was designed to acquaint the students with the many varied opportunities for a career in pharmacy.

Arizona receives grant. The Upjohn Company recently presented the University of Arizona College of Pharmacy with a $3,000 unrestricted grant for graduate

training and research. Under the direction of Dr. Albert Picchioni, the native plants of the Southwest and of Northern Mexico will be studied for their medicinal value.

Gertsner passes. Mr. Robert R. Gertsner, Trustee of Brooklyn College of Pharmacy for many years, passed away October 18, at the age of sixty-five. He was active in the Pharmaceutical Council of Greater New York and was a member of the State Board of Pharmacy for ten years.

Silverman receives grant. Dr. Harold I. Silverman, Brooklyn College of Pharmacy, recently received a research grant from the S. B. Penick Foundation to conduct phytochemical investigations on selected members of the Ginger Family for medicinally useful constituents.

Sears appointed. Mr. Samuel P. Sears, an attorney, member of the Council of the Boston Bar Association, and Director of the Boston Administrative and Research Company, has been appointed to membership of the Board of Trustees of New England College of Pharmacy.

Whitney passes. Mr. Harvey A. K. Whitney, prominent hospital pharmacist and founder of the American Society of Hospital Pharmacists, passed away at the University Hospital, Ann Arbor, Michigan, December 15, at the age of sixty-three. Mr. Whitney was formerly chief pharmacist of University of Michigan Hospital.

Eiler heads symposium. Dr. J. J. Eiler, Associate Dean of the School of Pharmacy, University of California, was chairman of the Symposium of Hospital Pharmacy at Lake Arrowhead, California, August 31 to September 1. More than 100 hospital pharmacists attended.

Levy to Buffalo. Dr. Gerhard Levy has been appointed assistant professor of pharmacy at the University of Buffalo. Dr. Levy received the Doctor of Pharmacy degree in 1957 from the University of California. Since that time he has collaborated with Dr. T. W. Schwarz on a research contract with the Armed Forces Medical Procurement Agency dealing with surgical lubricants. Dr. Levy was the recipient of the Lunsford Richardson Award (Western Division) in the spring of 1957.

Mittelstaedt with Navy. Dean Stanley G. Mittelstaedt, University of Arkansas, was on duty at the U.S. Naval Hospital at Corpus Christi, Texas, in his reserve officer rank of Commander. During his tour he participated in a review of procurement procedures of medical supplies and drugs.

Easterly receives grant. Dr. W. D. Easterly, Jr., University of Arkansas, recently received research grants from the American Academy of Arts and Science ($500) and Sigma Xi ($250) for the continuance of work with bromal and dichloroacetaldehyde derivatives.

Dusenberry receives grant. Dr. James E. Dusenberry, University of Arkansas, recently received a National Institute of Health grant of $2,300 for continuance of study of the nitrogenous constituents of an alkaloidal nature from various African ergots.

Arkansas poison control center. In response to the recommendation of the American Academy of Pediatrics, the Arkansas State Association of Pediatrics is planning a poison control information center. Dr. Dusenberry, University of Arkansas, has been appointed to serve as an advisor to represent the School of Pharmacy in this undertaking.

Butler receives grant. Butler University College of Pharmacy recently received a grant of $10,000 to begin a manufacturing unit in tableting and a gift of $3,500 for equipment.

Stuart receives grant. Dr. David M. Stuart, Oregon State College, has received a $2,500 grant from Smith, Kline and French Laboratories for research on the synthesis of alcohol esters which have shown promise in relieving high blood pressure. He will be assisted in this project by Dr. Leo Geller, German post-doctoral student.

Christian speaks. Dr. John E. Christian, Purdue University, spoke before a Charles Pfizer and Company research seminar held in Brooklyn, New York, October 30. Dr. Christian spoke on "The Application of Radioactive Isotopes to Pharmaceutical Research."

New journal. In January, 1958 the *International Journal of Health Education* came into existence. This quarterly journal in French and English will have as its objective the linking together of all those interested in health education throughout the world. It is sponsored by the International Union for Health Education of the Public. The subscription price is $3.00 a year, and the address of the publication is 3, rue Viollier, Geneva, Switzerland.

Massachusetts receives grant. Dr. William O. Foye and Dr. Edwin L. Prien, Massachusetts College of Pharmacy, are directing a research project which was recently granted a $9,775 stipend by the United States Public Health Service.

PCP Science Day. More than 600 persons attended the Science Day exhibits at Philadelphia College of Pharmacy, November 1 and 2.

Griffith returns. Dean Ivor Griffith, Philadelphia College of Pharmacy and Science returned October 18 from a six week trip through Europe. Much of this time was spent in Israel.

Anderson at PCP. Mr. Ron Anderson, Lecturer in Pharmacy, University of Adelaide, is spending a year at Philadelphia College of Pharmacy under the auspices of a Fulbright Travel Grant.

Florida receives grant. The National Institutes of Health awarded the sum of $450,000 to the University of Florida Health Center to build research laboratories which will connect the planned pharmacy wing with the Medical Science Building. Both the College of Pharmacy and the College of Medicine will use these facilities.

Durham initiated into Rho Chi. Xi Chapter, Rho Chi Society, at the University of North Carolina on December 17, initiated Congressman Carl T. Durham into honorary membership in the Society. Congressman Durham represents the Sixth Congressional District of North Carolina, and attended the University of North Carolina School of Pharmacy 1916-1917. He is a former pharmacist of Chapel Hill, North Carolina.

Burckhalter appointed. Dr. Joseph H. Burckhalter, Professor of Pharmaceutical Chemistry, University of Kansas, has been appointed a special consultant to the National Cancer Institute and named a member of the chemistry panel of the Cancer Chemotherapy Center of the Institute.

Lunsford Richardson Pharmacy Awards. The fourth annual Lunsford Richardson Pharmacy Awards will grant over $9,000 to pharmacy students and colleges of pharmacy in the United States and Puerto Rico. The Richardson Awards are sponsored by Vick Chemical Company and its two pharmaceutical subsidiaries, The Wm. S. Merrell Company and The National Drug Company. The awards are designed to encourage students to investigate current pharmacy problems, to summarize and present their findings for the benefit of other students and investigators, and to broaden student interest in the profession of pharmacy. Undergraduate subjects for the 1958 awards are intended to focus the student's attention on improving interprofessional relations. The subjects give the students an opportunity to contribute new thoughts toward bettering the relationship with allied health professions. The students may elect to write on one of two topics: "What can I, as a pharmacist, do to practice and to promote pharmaceutical ethics?" and "How can I, as a pharmacist, improve my professional status as a member of the health team?"

Awards of $500 will be presented to four undergraduate students who submit the best papers on either of the subjects. Four graduate students who submit the best scientific research papers will receive awards of $500 each. The schools of pharmacy attended by the winning students will also share in the awards. Awards of $500 will be given to the schools where the winning graduate and undergraduate students are enrolled. In addition sixteen Honorable Mention Awards of $100 will be given to students submitting worthy papers.

Neimeth receives honorary degree. Mr. Edward Neimeth, President, Board of Trustees of Brooklyn College of Pharmacy, was awarded the honorary Doctor of Laws degree by Long Island University, November 18, 1957.

Brecht heads Rho Chi. Dean Edward A. Brecht, University of North Carolina, has been elected National President of Rho Chi Society in the recent mail ballot of chapters.

Kremers Lecture. The Edward Kremers Memorial Lecture, sponsored by Eta Chapter of Rho Chi Society at the University of Wisconsin, this year was delivered by the son of the man for whom the series is named. Dr. Roland Kremers, son of Dr. Edward Kremers, is Senior Research Associate at the Institute of Paper Chemistry in Appleton, Wisconsin.

Nolen appointed. Dr. Herman C. Nolen, President of McKesson & Robbins, Inc., has been appointed professor of pharmacy administration in the new Graduate Division of Long Island University's Brooklyn College of Pharmacy.

New journal. A new journal, *The American Journal of Cardiology*, made its appearance in January. This monthly publication is the official journal of the American College of Cardiology. It is intended that this publication will provide information concerning important developments in clinical research, comprehensive reviews of subjects of current interest by outstanding clinicians, and provocative ideas concerning the past, present, and future of clinical cardiology. The subscription price is $12 a year, and the address of the publication is 11 East 36th Street, New York 16, New York.

Wayne receives gift. Wayne State University College of Pharmacy has received a gift of laboratory chemicals, books, fixtures, and equipment valued at $10,000 from Mr. and Mrs. Peter Klopp, Detroit, Michigan. Mr. Klopp is an alumnus of Wayne and has been president of the Klopp Engineering Company since its founding in 1923 and holds numerous patents on electronic coin counting machines.

Mr. Klopp acquired the material given to Wayne because of his interest in biological chemistry.

Mrs. Lee passes. Mrs. Edith Lee, wife of Dr. C. O. Lee, Ohio Northern University, passed away December 12, 1957, of a heart attack.

Burt in Texas. Dean Joseph B. Burt, University of Nebraska, President of the American Pharmaceutical Association, addressed the student body of the College of Pharmacy of the University of Texas December 10, 1957.

Rutgers extension. The Extension Service of Rutgers—The State University has been active in offering several courses for graduate pharmacists, chemists, nurses, medical, and public health technicians, drug and cosmetic employees, and junior executives in the pharmaceutical industry. These courses include: (1) A Survey Course in Microbiology, (2) A Survey Course in Pharmacology, and (3) Development and Marketing of Drugs.

Another extension activity in public, adult education is the television series, "Drugs and Your Mind," presented by Dr. Morton J. Rodman, Professor of Pharmacology. Dr. Rodman presented eight television programs from November 18 through January 13 over WATV, Newark at 5:30 p.m. The topics of these programs were "Alcohol: Drug, Food, and Poison," "Barbituates: Boon or Bane?" "Tranquilizers," "Hallucinogenic Drugs," "Central Nervous System Stimulants (Analeptics)," "Pain and the Opiates," "Narcotic Addiction," "Non-narcotic Analgesics."

NIH grant to Wyoming. The National Institutes of Health recently awarded $10,015 to Dr. Raymond J. Kahl, Associate Professor of Pharmaceutical Chemistry, University of Wyoming. Dean David W. O'Day and Professor William E. Johnson will be coinvestigators. The grant is for a period of three years and was awarded to aid research in the synthesis and pharmacology of beta-(3-furyl) alkylamines.

King receives grant. Dr. Theodore O. King, Professor of Pharmacology, University of Wyoming, with coinvestigator Dean David W. O'Day, received a research grant for one year of $2,150 for research on cholinesterase and smooth muscle pharmacodynamics. The grant was made through the National Advisory Council on Neurological Diseases and Blindness of the National Institutes of Health.

Reif on leave of absence. Dr. Edward C. Reif, Dean of the College of Pharmacy, University of Pittsburgh, on February 1, 1958, went on a leave of absence until his retirement June 30, 1958. Dr. Joseph A. Bianculli, Professor of Pharmaceutical Chemistry, University of Pittsburgh, has been appointed acting dean.

AAAS meeting. Pharmacy Section Np held nine sessions December 27 through December 30 at Indianapolis. A total of twenty-six contributed papers on original studies were reported, and one round-table discussion and two symposia were held. Over 200 persons registered as having attended one or more of the Pharmacy Section meetings.

The AAAS Council, the governing body of the Association, elected Dr. George F. Archambault, Chief of the Pharmacy Branch of the U.S. Public Health Service a Vice President of the Association and elected Dr. J. V. Swintosky of the Smith, Kline and French Laboratories to serve on the Committee-at-Large of the section for a four year term. Dr. Archambault will also serve as chairman of the section for the coming year.

Of considerable interest was the symposium on "A Pharmacological Approach to Mental Illness' which attracted interest outside the pharmaceutical group in attendance. Various aspects of the pharmacology of mental illness were discussed by five experts in the field. Dr. J. I. Nurnberger, Chairman of the Department of Psychiatry, Indiana University, served as moderator. Dr. I. H. Slater, Head of the Department of Neuropharmacology, Lilly Research Laboratories, discussed the general pharmacological aspects. Dr. T. Verhave, Animal Psychologist at Eli Lilly, discussed animal behavioral studies of drugs used in mental illness. Dr. N. S. Kline, Director of Research at the Rockland State Hospital, discussed clinical studies of the important drugs used in mental illness. Dr. J. Cole, Chief of the Psychopharmacology Service Center of NIH, discussed the function and operation of the recently formed center.

Dr. R. C. Anderson, Head of the Toxicology Department of the Eli Lilly Co. and Chairman of the Section, opened the contributed-papers sessions which consisted of the presentation of the results of original research. The papers presented were of unusual merit. Dr. G. L. Jenkins and coworkers at Purdue University reported on the synthesis of a series of diphenic acid derivatives. The synthesis of epoxide polymers of steroidal compounds was discussed by Dr. W. F. Head and W. M. Lauter. H. Schriftman, Wyeth Institute, presented a method of analysis of phenylephrine using filter paper chromatography. D. E. Cadwallader from the University of Florida discussed the effect of salts on the permeability of red corpuscles. G. S. Banker and J. E. Christian, Purdue University, presented radioactive tracer techniques for studying the uniformity of distribution of ingredients in tablet matrices. Methods for the measurement of the particle size of powders were reported by Dr. J. V. Swintosky of Smith, Kline and French Laboratories. Gastric

and intestinal absorption of penicillin was discussed by R. O. Froman, R. C. Anderson, and C. C. Lee, all from the Eli Lilly Laboratories. Dr. O. B. Myres, Butler University, presented information on the gastro-intestinal absorption of isoniazid, PAB, and promizole. Dr. C. N. Rice, Eli Lilly, discussed the lymphatic absorption of B-sitosterol and chollesterol. The tissue distribution of salicylamide and the oxidation metabolites of salicylates were reported by W. F. Bouquet and J. E. Christian of Purdue University and R. E. Crabtree of Eli Lilly.

The Hospital Pharmacy group had a very informative and well-attended full-day session under the direction of Dr. G. F. Archambault and J. A. Oddis. A number of organizations were represented and participated in the meeting by discussing several important subjects of direct interest to the hospital pharmacist, including legal and other implications in the labeling of nursing station medication containers, local poison control centers, legislative controls over hospital pharmacy at the state level, hospital pharmacy committees, economics and the profession, and several others. A symposium on recent trends in medication included the following participants: C. J. York spoke on tissue culture; R. H. Behnke spoke on drug therapy in cardio-vascular disease; H. D. Bryan presented recent trends in pediatric medication; and R. C. Bogash discussed the subject of compatibilities of intravenous and intramuscular admixtures. Luncheon, entertainment, and dinner were sponsored by Eli Lilly, Mead Johnson, and McKesson and Robbins, respectively.

On Sunday, December 29, the Pharmacy Section held joint sessions with the Section on the History and Philosophy of Science and the Philosophy of Science Association during which a symposium, "Can Science Provide an Ethical Code?" was held.

Ralph W. Ernsberger, Eli Lilly, presented a paper on how metric advantages can be and have been implemented in pharmaceutical manufacturing. This was followed later by a round-table discussion on the subject moderated by J. T. Johnson, President of the Metric Association. R. J. Dille, R. W. Ernsberger, J. F. Hollings, J. E. Schneider, and R. G. Weigel participated in the discussion.

Eli Lilly and Company sponsored a luncheon and tour of the pharmacological research facilities on Monday afternoon with approximately forty persons attending.

In our program we do not propose to make a scientist out of every student of pharmacy, but we do expect to train him so he can practice pharmacy scientifically and enable him to move in a larger sphere of usefulness.

Rufus A. Lyman, Am. J. Pharm. Ed., 5, 116 (1941)

BOOK REVIEWS

Colleges for Our Land and Time, Edward Danforth Eddy, Jr. Harper & Brothers, New York, New York, 1957. ix + 328 pp. $4.50.

This book is an historical account of the development, philosophy, and achievements of the Land-Grant Colleges in America beginning with the passage by the United States Congress of the Morrill Land-Grant Act of 1862 and proceeding, by periods, to contemporary times. Major emphasis is given to the formation, struggles, and growth of the schools of agriculture, home economics, veterinary medicine, and engineering, together with extension services, experiment stations, and research in these fields. However, the land-grant idea is described as being much more than just this. It was the leading force in the democratization of all levels of education in America, both public and private. This came about by their successful achievement of combining the traditional liberal arts and the practical with equality and educational opportunity. In higher education the tremendous growth of the American state university in quality as well as size is one obvious evidence of this achievement.

Those interested in university military instruction and two current controversies in education, namely, the problem of integration and the question of federal aid to education would profit from reading this book. The well-documented commentaries on these two subjects during the past 100 years should provide the basis for an enlightened understanding of the problems and a reasonable, unemotional approach to their early solution. While the author has made no attempt to enter into the pros and cons of federal aid to education, the record clearly demonstrates that the Land-Grant Colleges and Universities could never have achieved the high and respected place they enjoy in American and world education without continuing federal financial aid in its numerous forms.

The author has made a significant contribution to a better understanding of the American system of education. The book is far more than a treatise on education in agriculture and the mechanic arts. It commends itself to everyone interested in education, whatever his primary interest. Education for pharmacy, while not specifically identified in the Morrill Act and not mentioned in this volume, has much in common with the philosophy of the land-grant idea. Modern pharmaceutical education in America has its roots and has gained maturity in the land-grant movement and was part of that struggle for a respected place in higher education.

Quotations from the writings of leaders in American education over the past 100 years are extensively and ingeniously interwoven throughout the work and provide for zestful reading. This, together with the appendices, a list of Land-Grant Colleges and Universities, footnotes, selected references and an excellent index, makes the volume a valuable reference book for college of pharmacy libraries.

Roy A. Bowers
Rutgers—The State University

Quantitative Pharmaceutical Chemistry, Glenn L. Jenkins, John E. Christian, and George P. Hager. Fifth Edition. The Blakiston Division, McGraw-Hill Book Company, Inc., New York 36, New York, 1957. xviii + 852 pp. 61 figs., 82 tbls. $8.50.

In the field of analytical chemistry, covered by a preponderance of text books, *Quantitative Pharmaceutical Chemistry* has continued to occupy an enviable position for slightly more than a quarter century in this country as the only available instructional text and laboratory manual in pharmaceutical analysis. The authors have responded to the responsibility which such a position entails by providing each succeeding edition with well qualified information reflecting the progress in this field. The fifth edition includes not only newer procedures but newer physico-chemical techniques required in the assay procedures of USP XV and NF X.

The first four chapters review the basic principles of gravimetric and titrimetric analysis for the benefit of those schools of pharmacy that give a combined course of general quantitative analysis and pharmaceutical analysis. The next six chapters deal with more specific volumetric methods, and gasometric methods of the official compendia.

Part II includes nine chapters on specialized drug analysis, including determination of moisture, crude fibre, extractives, fixed and volatile oils, alkaloidal assays, and enzyme potency determinations.

Part III embraces, in eleven chapters, the physico-chemical methods and instrumentation techniques involved in official assays, physical constants such as specific gravity, melting and boiling points, solubility, refractive index, optical rotary power, viscosity, pH, potentiometric titrations, colorimetry, spectrophotometry, electrolytic methods, and two new chapters covering radioactivity, including isotope tracer techniques, and chromatography, including column and paper chromatography.

In each chapter there is a discussion of theoretical principles and of reasons underlying the several steps of the determinations. Examples of calculations are worked out and tables of official requirements are included. Each chapter concludes with a series of questions and problems.

Instrumentation techniques are becoming so commonplace in the drug industry that it would be desirable to amplify still further these chapters of the text. The discussion of filter photometry is rather sketchy. The thiamine and riboflavin determinations as applications of fluorophotometry should be discussed in greater detail. A future edition might well include chapters on flame photometry, infra-red spectrophotometry, polarography, and gas chromatography. The chapter on isotopic tracer techniques is a valuable addition. It would be advisable to include information on special facilities required, shielding, personnel hazards and radioactive waste disposal.

The list of related texts and reference books is comprehensive and up-to-date. In this rapidly advancing field it might be well to list some of the important journals and the annual reviews appearing in *Analytical Chemistry*.

Both the typography and the editing are excellent. This book definitely belongs in the category of a required text.

Abraham Taub
Columbia University

Systematic Organic Chemistry, Theory and Applications, Hugh Muldoon and Martin I. Blake. McGraw-Hill Book Company, Inc., New York, New York, 1957. vi + 828 pp., 56 figs., 45 tbls. $7.75.

The rapidly increasing field of theoretical organic chemistry makes it difficult for an author to include in his book or for a teacher to present to his beginning class representative descriptive material concerning biologically active or commercially important organic compounds. Such information gives the student an appreciation of the practical application of organic chemistry and stimulates his interest by bringing the subject closer to his own experiences. The authors of this attractive textbook of organic chemistry have, by a careful evaluation of the material necessary for an elementary course, managed to write an adequate text and include in it the descriptions of the physical and chemical properties of a large number of organic compounds.

Aliphatic and aromatic compounds are considered separately. Special sections or chapters on such projects as petroleum, rubber, carbohydrates, lipids, heterocyclic compounds, terpenes, dyes, enzymes, antibiotics, steroids, hormones and vitamins should appeal especially to students of pharmacy and the biological sciences. New syntheses and developments in these fields are reported. Biographical sketches of those making noteworthy contributions to this branch of chemistry provide the student with an appreciation of the historical development of the field. Questions at the end of each chapter serve as homework problems or as starting points for classroom discussion.

Chemical reactions are carefully presented using the modern concepts of electronic structure. An introduction to the orbital theory provides for a more thorough understanding of molecular structure and reaction mechanism. However, the practice of writing equations in which the atoms or groups of atoms splitting out of combining molecules are circled is regrettable and is not in keeping with modern methods of teaching organic chemistry. Also, the omission of the carbonium ion from several of the mechanisms for the reactions of alcohols is inaccurate and does not properly explain the course of the reactions.

The authors have succeeded in writing an interesting and perhaps an inspiring introduction to organic chemistry. The presence of a large amount of descriptive material may tend to focus the student's attention upon the chemicals rather than the chemistry. Its inclusion has definitely limited the number of chemical reactions that could be discussed, but the authors have included those reactions necessary for an adequate beginning course in organic chemistry. The book will be especially welcomed by teachers having difficulty in interesting the non-chemistry major in organic chemistry, but it is not recommended as a reference book.

James E. Gearien
University of Illinois

Colorimetric Analysis, Volume One, Noel L. Allport and J. W. Keyser. Second Edition. Chapman & Hall Ltd., London, England, 1957. xi + 424 pp. $9.00.

This book covers an area of analysis that should be receiving much more attention than up to the present, namely, the determination of various substances, natural and synthetic, in body fluids and tissues. The book does not cover general principles and theories involved in colorimetric procedures, but is limited in scope to the description of colorimetric methods of clinical and biochemical significance. In addition to the natural substances present in body tissues, a limited number of drugs such as barbiturates, dextran, disulfiram, alcohol, salicylates, sulfonamides, and thiouracil are also covered. Ultraviolet, infrared, and flame photometry are given no consideration in selection of available methods.

The methods are presented in complete detail including the preparation of reagents. Interferences and limitations of the methods are discussed whenever possible and include many observations by the authors. When applicable the authors also present a discussion of the usual concentration ranges encountered and their clinical significance. References for further reading are provided for each method. In a number of instances

modern instrumentation would result in an upgrading of the methods presented, particularly in those utilizing the Lovibond tintometer.

Colorimetric Analysis is not designed for textbook use except possibly as a laboratory manual in an advanced biochemistry laboratory. This book should prove a very useful reference to the pharmacologist, biochemist, toxicologist, physiologist, and others interested in the determination of naturally occurring substances and synthetics in biochemical samples. The methods presented for drugs, while quite limited, should provide examples and guides for development of similar methods for other substances.

Orville H. Miller
University of Southern California

Zinsser's Textbook of Bacteriology, David T. Smith and Norman Conant. Eleventh Edition. Appleton-Century-Crofts, Inc., New York, New York, 1957. i + 931 pp., 422 figs., 100 tbls. $15.00.

For those of us who teach microbiology in schools of pharmacy or medicine there has been a need for a text that would embrace all phases of microbiology, as well as immunology, serology, epidemiology, and public health. At last we are privileged to offer our students a "Zinsser's Bacteriology" that has been taken out of the realm of a reference book. This is more than another edition of a work that included all the essential topics of the subject but left too much that was lacking in clarity for the average student.

The authors of the eleventh edition have given us a totally revised text. The entire structure is vastly improved and the contents brought up to date. Recent history-making discoveries are a welcome addition to the condensed chapter "History of Bacteriology." References to the technical methods and procedures follow the descriptive material. This is an innovation that should give impetus to student interest. The logical sequences in which the salient facts are considered in each chapter dealing with the morphology, physiology, and genetics of the cell add to the clarity of this book.

Consideration is given to the chemistry of the microbial cell and its index to the nutritional requirements of the organism. More recent discoveries in immunology and the lucid interpretations of the data have brought a welcome change in the contents of these chapters.

Terms not ordinarily understood by the biology student are carefully defined as they appear in the context. Many excellent micrographs are included in the 200 pages on virus diseases of plants, insects, animals and man. The Edwards and Ewing Biochemical Reactions of the important *Enterobacteriaceae* is a significant inclusion to this valuable book.

As this is not a text in immunology, the emphasis is rightly placed on the characteristics of each microorganism which includes its antigenic structure. The concluding chapters contain a comprehensive compilation of the various laboratory techniques for the identification of the microorganisms. The chapters on the rickettsial, viral and mycotic diseases have been enlarged as have the methods for their isolation and identification. The antigenic structure of the *Salmonella* having gone through many changes and additions in the past is placed, I am happy to see, in the Appendix.

Other textbooks used or prescribed for the student in the medical sciences are either incomplete in scope such as Kelly and Heit, and Gershenfeld or the emphasis is either put on the immunology, as in Jordan and Burrows, or on the chemistry of the bacteria, as is the case in Levine's text.

I have but one small criticism to make of this delightful edition. Although recognition is given to the nomenclature of the microorganisms in the recent edition of *Bergey's Manual,* the same old confusion concerning the classification of *M. aureus* (*Staph. aureus*) is still perpetuated.

Fanchon Hart
Columbia University

Solvent Extraction in Analytical Chemistry, G. H. Morrison and H. Freiser. John Wiley & Sons, Inc., New York, New York, 1957. xi + 269 pp., 39 figs., 32 tbls. $6.75.

This book presents a thorough treatment of solvent extraction as applied to the separation of metals. In doing so it emphasizes the growing importance of solvent extraction as a powerful analytical tool.

The subject matter is divided into four parts. The first part deals with principles of extraction, a comprehensive description of chelating agents, chelate complexes, and ion association complexes. The quantitative aspects of extraction equilibria and the factors affecting the rate of achievement of equilibrium between two liquids are included in this section.

General methods and techniques of solvent extraction are discussed in the second part. Detailed descriptions of the methods and apparatus make this a particularly valuable portion of the book.

The third section is devoted to a discussion of the individual ion association systems and chelate systems and their specific uses in metal extraction.

The remainder of the book describes selected procedures for the extraction of various elements. Several procedures for each element are presented. As an aid to choosing the most suitable procedure, information is provided the reader concerning selectivity, interfering substances, and color characteristics of the metal complex.

While the book is concerned primarily with the solvent extraction of metals, much of the theory and discussion of methods, techniques and apparatus will be helpful in organic extractions. This book will be a useful reference for research workers and

graduate students in the fields of pharmacy and pharmaceutical chemistry where solvent extraction finds widespread application.

James G. Young
University of Tennessee

Dictionary of Poisons, Ibert and Eleanor Mellan. Philosophical Library, Inc., New York 16, New York, 1956. iii + 148 pp. $4.75.

This book on poisons is unique in that it is written in such a manner as to make the information presented by the authors understandable even to the person not familiar with the terminology usually associated with the subject of poisoning. This feature would appear to make such a book highly desirable, especially for use by parents around the home where most of the poisoning incidents, which usually involve children, take place.

The introductory pages of the book present a brief discussion concerning the public health problem of accidental poisoning and a history of the use of poisons as suicidal agents. This is followed by important suggestions of general measures to be carried out by the person confronted with a poison victim. A list of emetics, demulcents, cathartics, and stimulants that are sometimes employed in the emergency first aid treatment of poisoning can be found in these beginning pages. The remainder of the book presents approximately 145 poisons, each of which is usually considered as follows: possible causes of poisoning, symptoms, antidote and first aid measures. In addition to this information, thirty-six of the poisons are introduced by a more detailed discussion of their physical, chemical, and toxic characteristics as well as many interesting historical features, such as their use medicinally as drugs and intentionally as poisons from the time they first became known to man. All of the poisons are conveniently arranged alphabetically hence the title *Dictionary of Poisons*. There is no table of contents or index.

The chief value of this book is as a reference for simple first aid measures that may be performed by anyone at the scene of the poisoning incident. Little consideration is given to the clinical toxicology of poisons; thus, it will not be as useful to physicians and poison control centers as toxicological textbooks which also include this latter aspect.

A few of the first aid procedures suggested in this book seem questionable. For example, on page 13 the following treatment is recommended for chemical burns:

"When the eyes are burned by an alkali, neutralize by washing them with a 3 to 5 per cent solution of sodium bicarbonate (baking soda)"!

This advice is not consistent with that given for the antidote and first aid treatment of caustic alkali poisoning on page 28 in which it is stated that:

"If the alkali has entered the eyes: Wash with a saturated solution of boric acid."

In a few instances, adequate precautionary measures associated with certain first aid procedures are lacking. For instance, on page 140 an emetic is advised for strychnine poisoning; however, no statement is made to the effect that emesis should not be induced if reflex hyperexcitability has occurred. The general use of emetics in poisoning is discussed on page 8. The statement that emetics should not be used when poisoning is due to corrosives such as caustic alkalies or acids should also have included petroleum distillates such as kerosene. Further, this discussion on the use of emetics would have appropriately included the proper technique for inducing emesis, since dangerous aspiration of stomach contents into the respiratory tract may result from improper procedures.

Finally, in view of the increasing number of accidental poisoning cases, it appears that the introductory part of the book could have served an additional useful purpose by stressing prevention as a most important aspect of the problem of poisoning and by presenting the proper methods for the handling and storage of poisons in and around the home.

This reviewer would recommend this book as an addition to a pharmacy library mainly for the excellent historical data presented on some of the poisons.

Albert L. Picchioni
University of Arizona

Biochemical Contributions to Endocrinology, Sir Charles Dodds, Stanford University Press, Stanford, California, 1957. 76 pp., 28 figs., 4 tbls. $3.00.

This volume, number eight in the Stanford Studies in the Medical Sciences, is a revised version of the five papers presented by the author last autumn at the Medical School of Stanford University, in San Francisco, as the Lane Memorial Lectures of 1956. Subtitled "Experiments in Hormonal Research," most of the book is devoted to a consideration of the chemistry, physiology and usage of estrogenic substances. Readers familiar with the brilliant contributions of the author in this field as well as students just beginning work in endocrinology will be fascinated by the account of the extensive experimentation which preceded the discovery of stilbesterol and its congeners. These investigations afford an excellent demonstration of the pattern of much modern biochemical research, from the first hints of the nonessentiality of the steroid nucleus for estrogenic activity, which were afforded by structure-activity relationship studies, through numerous setbacks and advances to the final synthesis of highly active compounds whose heuristic and practical importance it would be difficult to overestimate.

In the introductory paper the author presents data supporting his postulation of a physiological role for the neurohypophysis in the control of gastric secretion. In view of the paucity of reliable data relating variations in gastric secretion to alterations within

physiological limits of the blood levels of posterior pituitary hormones, other biochemists will find it difficult to share the author's enthusiasm for this theory.

The final chapter is devoted to a description of the isolation of aldosterone, a compound whose discovery, like that of stilbesterol, has had an immediate and profound effect upon medicine. The book closes with a plea for the support of basic research, pointing out how impossible it would have been to predict the practical results of the experiments described at the time they were begun.

As a record of the thinking of a prominent scientist who has made many distinguished contributions in his field, as well as for its provocative theorizing, this book should be of interest to workers and students in endocrinology and the related subjects even though most of the data here presented is available elsewhere. A six page list of references adds considerably to the book's value.

Stanford L. Engel
Rutgers—The State University

Chemistry of Plants, Erston V. Miller, Reinhold Publishing Corporation, New York, New York, 1957. vii + 144 pp., 13 tbls. $4.75.

This book is a compilation of the better known plant constituents and chemical processes which occur in living plants.

The author has attempted to cover the most complex field of plant chemistry. He has divided the 163 pages of text into 12 chapters, each chapter title bearing the name of a particular chemical grouping of constituents. They are: carbohydrates, proteins and other nitrogen compounds, lipides, plant pigments, enzymes, organic acids, plant hormones, gycosides, alkaloids, vitamins, and elemental constituents. The last chapter is entitled "Other Plant Products" in which the author briefly discusses ethylene, growth substances other than plant regulators, and liquid diffusions, and mentions antibiotics.

In general the treatment given the individual chapters follows a pattern. This includes a classification of the group, occurrence (and distribution), function, some structural formulas, some properties, and, in certain instances, a medicinal use.

There is an extremely abbreviated treatment of the synthesis of starch, amino acids, proteins, fats, chlorophyll, carotenoid pigments, anthocyanins, and anthoxanthenes. As an example, on page 34, the author's discussion of synthesis of fats in plants:

> It is probable that the synthesis of fats in plants occurs in three steps: (1) synthesis of fatty acids, (2) formation of glycerol and (3) combination of fatty acids with glycerol, to form triglyceride. Both the fatty acids and glycerol are apparently derived from carbohydrates, certain intermediate compounds resulting from the oxidation of sugars being utilized in the synthesis.

Included also is a brief treatment of photosynthesis, reduction of nitrates, a review of the conversation of starch to pyruvate, and the citric acid cycle.

In the chapter on plant hormones, a relation between chemical structure and biological activity is presented in some detail. This is one of the better portions of this compilation.

There is little, if any, mention of the isolation, and treatment, of the plant constituents.

It is the opinion of this reviewer that this book is of such an elemental nature that it would be of little value to the student in pharmacy.

James E. Dusenberry
University of Arkansas

Stedman's Medical Dictionary, Norman Burke Taylor, Editor, in collaboration with Lieut. Col. Allen Ellsworth Taylor, Classical Editor. Nineteenth Edition. The Williams and Wilkins Company, Baltimore, Maryland. xlvi + 1656 pp., 23 figs., 94 tbls. $12.50.

The four years that have passed since the eighteenth edition of *Stedman's Medical Dictionary* have been very productive in the creation of new medical terms. Several thousand of these have been included in the nineteenth edition. A number of new illustrations have been added and many of the old ones redrawn or deleted. The names of pharmaceutical preparations have been changed from Latin to English to conform with the latest editions of the United States and British Pharmacopeias and the National Formulary. The definitions of the words and terms have been expanded or revised so that they conform with modern concepts and implications.

The format of the new edition is similar to that of the eighteenth edition. However, a few specific changes have been made. A table of contents has been added listing the general contents, an index of plates, an index of pharmaceutical tables, and an index of anatomical tables. This table of contents will be useful to those not familiar with the book for quick orientation with a minimum of effort.

The forty pharmaceutical tables are an innovation with this edition. This tabulated information, under such headings as elixirs, emulsions, extracts, oleates, tablets, mixtures, etc., should be particularly useful.

It is always gratifying to see lexicographers incorporate related supplementary material in a reference book of this type, and not restrict themselves to the literal definition of a dictionary. These editors have neglected neither aspect in compiling this text. There are 1609 pages devoted to the definition, description and etymology of medical terms, which is a forty-four page increase over the previous edition. The supplementary material in the appendix has also been revised. The tables of "Standard Weights According to Height and Age"

for men and women have been deleted and the Nomina Anatomic, as revised by the International Anatomical Nomenclature Committee in 1955, has been added. This latter addition should prove very useful to the students of anatomy and allied fields.

In spite of the efforts of the editors and publishers of books, errors will often be found in the completed copy of a text. *Stedman's Medical Dictionary* is no exception. The errors are not of a serious nature, nor do they detract from the excellence of the book; but it is felt that the reviewer should point out that some discrepancies were noted. It was found that four of the pages for the plates listed in the "index of plates" in the table of contents do not correspond with the pages in the text proper. In all cases the page numbers were only different by one or two; so these errors are not as serious as it might seem.

The previous editions of *Stedman's Medical Dictionary* have enjoyed considerable popularity among persons in the health sciences. The nineteenth edition should have that same acceptance. This edition is a modern up-to-date medical dictionary and compares favorably with the other dictionaries of its class. A dictionary of this quality should be a part of the reference library of all persons interested in the health sciences.

Robert D. Gibson
University of Nebraska

The Chemistry of Organic Medicinal Products, Glenn L. Jenkins, Walter H. Hartung, Kenneth E. Hamlin, Jr., and John B. Data. Fourth Edition. John Wiley & Sons, Inc., New York, New York, 1957. x + 569 pp., 42 tbls. $10.75.

Like its preceding edition, this well known text in organic pharmaceutical chemistry is divided into sixteen chapters. The medicinal products are discussed in thirteen of the chapters according to their chemical classification. A new chapter has been added which is entirely devoted to antibiotics, and, although brief, it is concise and can serve well as a nucleus for further reading and classroom discussion. "Sterioisomerism" and "Some Physicochemical Properties of Medicinal Products" are the remaining topics of discussion. Extensive revisions have been made. Many topics of less importance or of historical interest have been condensed or deleted and the new material reflects the status of medicinal chemistry as of early 1956. Omitted in this edition are the reviews of elementary organic chemistry, the general bibliography, and the chapter on natural mixtures, which is more in the realm of pharmacognosy. The tables devoted to physical constants have been markedly reduced in number. The text gains in appeal by these deletions since more space can be devoted to the discussion of the more recent advances in organic medicinal products. The general bibliography is not missed since specific references to the literature are abundant in the footnotes and can be put to excellent use.

The discussion of each large chemical class follows a definite pattern: a general discussion which may include a short historical introduction, properties of the group, terminology, methods of synthesis, mode of action, structure and activity relationships, and uses. The ensuing discussion of the individual products is not limited to USP, NF, and NNR products.

Since the authors have found it expedient to depart from the complete chemical classification in order to devote a chapter to antibiotics, it is difficult to feel completely satisfied with the order of discussion of some products. Mephenesin is discussed with ethers; Mephenesin Carbamate is met 160 pages later. If Diperodon, Meprobamate, Mephenesin Carbamate, Ethinamate, Neostigmine, Salicylamide, Salicylanilide, and Pantothenic Acid must be discussed in succession, why should Carbachol be grouped with chlorine derivatives? Diphenadione seems isolated following Menadiol Sodium Diphosphate as does Pyridium preceding Pyridoxine. Where a compound may have more than one classification, a note may be used to make known this fact. For example, Gantrisin is discussed with sulfonamides. However, a note appears with isoxazole derivatives to remind the reader that Gantrisin is a member of this group, too. Greater use of such cross references would assist the student's efficient use of this text and would prevent duplication of discussions. Promizole is discussed in the chapter "Sulfur Compounds," and Thiazolesulfone is discussed in "Cycles with Two or More Heteroatoms." However, no cross reference is given to indicate that they are the same. These disadvantages are minor and the order of discussions can be modified by each instructor to coincide with his tastes.

This new edition should make new friends. It can serve adequately as a basic text in the study of organic medicinal products, especially if the instructor desires his students to make greater use of our official compendia and the library. Students will derive more benefit from this text if an instructor takes the time to assemble each large therapeutic class after its components have been discussed according to chemical class. If not adopted as a text, it should be readily available as a library reference book.

Joseph A. Zapotocky
University of Arizona

Micro-Analysis in Medical Biochemistry, E. G. King and I. D. P. Wotton, Editors. Grune and Stratton, Inc., New York 16, New York, 1956. 292 pp., 25 illus., 18 tbls. $4.00.

This book deals with a large number of medical biochemical micro-analytical methods, technics, and procedures for: whole blood, plasma, serum, electrophoresis of plasma proteins, cerebro-spinal fluid, feces, metabolic balance studies, flame photometry, analysis of calculi, gastric and duodenal analysis, test of function, radioactive isotype tests,

spectroscopic procedures, colorimetric and spectrophotometric analysis, hydrogen ion concentration, and volumetric solutions. The authors and several others, each well qualified in his field, have contributed to it. The analytical determinations are based on micro procedures rather than macro procedures, which is the more prevalent custom in textbooks of this kind. The procedures are thoroughly outlined for laboratory accuracy, principle, method, and calculation, but are at the same time clinically practical. The editors have succeeded in presenting in this work the importance of laboratory accuracy and a system of quality control. The text represents analytical clarity and well documented material in view of the rapid advances in biochemistry at the present time and its continuance to become of greater importance in the practice of modern medicine. Many diseases require laboratory tests not only for definite diagnosis but also for successful therapy and economic treatment in conjunction with the patient's history and physical examination. As the result of this book, it is now possible to carry out an analysis, with quantities of about one twentieth or one thirtieth of that previously required, and the results are practically of equal accuracy. This development has effected an immense saving of time and labor, especially for the analysis of compounds of high biological activity. This book brings together in a small volume new tests or modifications of those which were already in use, and scattered through many books and numerous journals. In this age of biochemistry it is safe to predict this book will be readily accepted by scientifically minded physicians, investigators, students of clinical biochemistry, and medical technicians as one of the most recent available introductions to micro-analysis in medical biochemistry and composed of well proved methods.

J. Earle Galloway
Drake University

Psychopharmacology, Nathan S. Kline, Editor. American Association for the Advancement of Science, Washington, D.C., 1956. x + 175 pp., 3 figs., 11 tbls. $3.50.

This is an interesting little book that might be useful to the clinician who wishes to arm himself with details concerning certain of the drugs in current use in the treatment of mental disease. It may also prove useful to the student as a quick but limited reference regarding specific applications of the drugs mentioned and as to the differences of opinion which exist concerning the development in this particular field of drug therapy. The brevity of the publication precludes any major contribution to the field.

The format is an increasingly familiar one, being the work of fifteen contributors at a symposium organized by the section on Medical Sciences of the AAAS and the American Psychiatric Association, 1954. There are eleven sections or chapters interspersed with the minutes of three panel discussions which follow the presentation of several of the papers.

The title of the book is somewhat misleading to the person who is expecting a comprehensive review of all the substances in current use in treatment of mental disease. Two drugs are given primary consideration, Reserpine and Chlorpromazine. The first part of the book is rather heavily weighted with discussions of case histories. These are probably of great significance to special groups, but do not lend too much to the student who is primarily interested in pharmacology.

There are two reasons why the book might be useful in the library as a reference text. It has made its appearance during a time of rapid development, and so it amounts to a sort of progress report. Secondly, it leaves the reader with the impression that only the surface has been scratched in a field that will eventually yield tremendous dividends. But in view of the tremendous numbers of publications now dealing with the pharmacology of drugs used in the treatment of mental disease, it is the opinion of the reviewer that the student who wants a comprehensive picture of this field would find more profitable material in many of the scientific journals.

Carl C. Riedesel
College of the Pacific

Antiseptics, Disinfectants, Fungicides, and Chemical and Physical Sterilization, George F. Reddish. Second Edition Revised. Lea and Febiger, Philadelphia, Pennsylvania, 1957. 975 pp., 67 illus., 134 tbls. $15.00.

The second edition has undergone extensive revision to keep pace with the vast and rapidly expanding field of antiseptics, germicides, and fungicides. Many sections have been expanded to include new material, and three completely new chapters have been added. An amazing accumulation of significant material has been presented by the contributors, who represent government, industry, and education.

In view of the increasing number of marketed preparations labeled sterile, the chapter on sterility tests and methods of assuring sterility takes on added significance. A full discussion of the USP sterility test elucidates the potential fallacy in sampling and interpretations. In view of this, pertinent information is given regarding statistical methods of random sampling and methods of assuring sterility. The chapter on methods of testing sanitizers and bacteriostatic substances is well organized and provides an exhaustive account of actual procedure. New definitions adopted by various government organizations, as a result of detergent sanitizing claims from industry, are discussed in detail. An excellent account of ultra-violet radiation and its use in controlling air-borne infections and reducing bacterial contamination of biological products is given in a separate chapter. Depth is provided by a discussion of the physics of radiation.

This is a well documented reference book intended for those engaged in basic scientific and industrial research in the field of antimicrobial agents. The text is profusely illustrated with graphs, tables, and charts which clarify discussions and provide additional significant information. Each chapter is followed by a comprehensive bibliography including the most recent publications.

The section on methods of testing should be expanded to provide more information on such topics as cold sterilization, solutions, aerosol testing, and laundry sanitizers. A much more serious defect is evidenced in the index, such an essential part of a reference text, which is not extensive enough. A separate chapter on virucides would be of considerable value. These shortcomings, however, do not detract from its usefulness.

This edition is beautifully printed and well bound. It provides the most complete account available on the subject; the first edition has already become a standard work of reference. Many provocative ideas are set forth which should stimulate further research on antimicrobial agents, and particularly on methods of accurately assaying their value. This book is certainly indispensable to the microbiologists in every phase of their endeavor.

Donald E. Shay
University of Maryland

Digitalis, E. Grey Dimond, Editor. Charles C. Thomas, Springfield, Illinois, 1957. xiv + 255 pp. $7.00.

This book is an account of a post graduate program presented by the University of Kansas Medical School on the subject of digitalis. The intent of the program and the book was to present the subject in a form useful to the practicing physician. For this reason the book is not as inclusive as the title would indicate. It is not a reference book for the pharmacognosist, phytochemist, or pharmacologist. It is an extensive text for those interested in therapy with digitalis. Since the proper use of this drug requires considerable background knowledge, it undoubtedly serves a very useful purpose.

The sections on pharmacology and physiology are adequate as bases for the discussions of the clinical use of digitalis even though many of the concepts presented suffer from brevity or oversimplification, while other sections are excellent examples of laboratory reporting.

Some of the clinical section is probably the high point of the book. However, the panel discussion which follows does such an admirable job of tying the theory to the practice that I found it by far the most interesting.

These meetings of theory and therapy are an essential part of continuing medical education. Both the laboratory and the practitioner gain new insights and the end result can only be better drugs used with greater discernment.

Richard K. Thoms
University of Connecticut

A Manual of Pharmacology, Torald Sollmann. Eighth Edition. W. B. Saunders Company, Philadelphia, Pennsylvania, 1957. 1535 pp. $20.00.

This venerable text, first published forty years ago, is a monument to Dr. Sollmann. The book has no peer as a convenient single source of detailed pharmacological information. Always an encyclopedic type of book, the eighth edition is even larger than the seventh. Sections considerably enlarged include: Protein Foods and Amino Acids, Cholesterol, Phospholipids, Vitamins, Adrenal Cortical Hormones, Anterior Pituitary Hormones, and Antibiotic Substances. New material covered includes: khellin, sulfones, nitrofurans, isonicotinyl hydrazides, lysergic acid diethyl amide, chlorpromazine, reserpine, serotonin, and meprobamate. Meprobamate is mistakenly termed "mepomate" throughout the text. One of the most useful features of Sollmann is the extensive bibliography, particularly if one has previous editions which cover earlier references.

This reviewer's principal criticism of the book arises from its basic structure which is essentially a loosely correlated mass of material without uniform regard for the customary pharmacologic or therapeutic classifications. While this should not trouble the experienced pharmacologist, to the novitiate the text is often contradictory, unwieldy, and confusing. This point may be illustrated by the example of the ganglionic blocking agents. If one consults ganglionic drugs in the index, he finds the material to be in the section entitled "Drugs Acting Peripherally on the Autonomic System." Here only two sentences are devoted to the relatively important drug, hexamethonium. After consulting the index again, one finds that hexamethonium is included in a section on "Cholinesterase Inhibitors." Reading this material without prior knowledge may then leave one with the erroneous impression that hexamethonium acts equally at the ganglia and motor end plates and this action is the result of cholinesterase inhibition.

Sollmann is not recommended for the undergraduate pharmacy student. If one wishes a recent comprehensive text, either Goodman and Gilman or Drill is superior for undergraduate study. Sollmann is a useful reference for the pharmacology graduate student and the researcher. It should be in every pharmacy school library.

Duane G. Wenzel
University of Kansas

Experiments in Biochemical Research Techniques, Robert W. Cowgill and Arthur B. Pardee. First Edition. John Wiley and Sons, Inc., New York, New York, 1957. ix + 189 pp., 21 figs., 16 tbls. $3.50.

This manual contains experiments that illustrate, as stated in its preface, "some of the major techniques of modern biochemis-

try." It is designed for use by advanced graduate students and advanced investigators to acquire familiarity with some special procedures, most of which are not included in laboratory manuals for basic biochemistry courses. In this, the book is unique. Experiments usually given in basic biochemistry courses are not presented in this book. Some techniques requiring elaborate equipment such as ultracentrifugation and boundary electrophoresis, as well as microbiological and hormone assays, and nutritional experiments, are also not included.

The book is divided into three sections. Section One, which contains experiments on physical chemical methods for separation and identification, includes the following topics: distillation at low pressures, countercurrent distribution, column chromatography (ion exchange, liquid-liquid partition, gas-liquid partition and adsorption), filter paper chromatography and zone electrophoresis. Section Two, which covers the biochemistry of enzymes, includes such techniques as enzyme assay by titration and by use of a colorimeter, purification of enzymes, enzyme induction in bacteria, and a few other techniques including the use of the Warburg respirometer. Section Three contains experiments illustrating radioactive isotope tracer techniques with procedures for measurement of radioactivity, and application of such isotopes as demonstrated by use of C^{14} in rat metabolism and carbon dioxide fixation by bacteria.

The list of the principal equipment and supplies for each experiment, and the list of major equipment and locker inventory in the appendix of the manual, help make for its convenient use.

The experiments are instructive and well conceived. However, in some cases, the introductory background material could be improved, especially in Section Three dealing with radioactive tracer techniques. There appear to be errors in Figure 15 which shows an incorrect wiring diagram, and in Figure 16 which should show a positive slope where a negative slope appears. Three other changes which might be made in the interests of greater accuracy are to refer to gamma rays as waves instead of particles, to change the stated resolving time of a Geiger counter from 5 to 200 microseconds, and to change the stated half-life of C^{14} from 5100 $\pm$ 200 years to about 5570 years.

It is the opinion of the reviewer that the usefulness of this manual could have been much enhanced by the inclusion of more information on the individual experiments and an expansion of the section in the appendix on "Notes to Instructors" which would have given more of the authors' experience with the experiments. It is believed that all parties concerned—the graduate student, the independent investigator, and the instructor—could be benefited by such expansion of the material without detracting from the development of the "research attitude" in the student which is well taken care of in this book.

T. W. Stearns
University of Florida

The Chemistry of Organometallic Compounds, Eugene G. Rochow, Dallas T. Hurd, and Richard N. Lewis. John Wiley and Sons, Inc., New York 16, New York, 1957. vi + 344 pp., 9 figs., 46 tbls. $8.50.

With this book the authors have met a long-standing need for a comprehensive, yet brief and readable, treatment of an important division of chemistry. While many papers have been, and are being, published in this area, there are few books dealing with the chemistry of organometallic compounds and, of these, none is particularly well-suited for use as a textbook.

In the first three chapters, the authors set the stage for a clear understanding of the main body of information with a discussion of the types of organometallic compounds and the general characteristics of each type, the theory of carbon-metal bonds (including bonds to transition metals), and general methods of preparation which served for most of the compounds discussed subsequently.

The next seven chapters consist of a systematic survey of the special methods of preparation, physical properties and reactions of the compounds of the alkali metals, and of the elements of Groups II, III, and IV, of arsenic, antimony, and bismuth, of selenium and tellurium, or iodine, and of forty-five elements of the four transition series. The compounds of phosphorus, a non-metal, are not included. In the case of iodine, which has faintly metallic properties, only those organic compounds in which iodine exhibits valence states higher than one are discussed. Organomagnesium compounds were assigned only the amount of importance due them as interesting examples of their types of substances. It was not the authors' intent to discuss the many uses of the Grignard reagent in synthetic organic preparations since there are several tomes available devoted solely to this topic. Throughout the book structural aspects of the compounds under discussion are very adequately covered.

The wealth of information in this book is supplemented with many tables of representative organometallic compounds, complete with literature references. For example, the discussion of organosilicon compounds is followed by five pages of tables and 518 references.

The final two chapters consist of (1) a brief discussion of the uses of organometallic compounds in the organic synthesis of nonmetallic organic compounds, and (2) special types of organometallic compounds, i.e., compounds containing carbon-metal bonds but which could not be included in any of the classes discussed previously. Numbered among these special types are fluorocarbon

derivatives, metal carbonyls, metal olefin complexes, cyanide and isonitrile complexes, metal carbides and hydrides. The book concludes with author and subject indices.

This well written and excellently organized book should be a valuable addition to the library of a college of pharmacy as well as to the personal library of the graduate student majoring in pharmaceutical or organic synthetic chemistry.

Aristotle J. Vazakas
Temple University

Editor's Note: In reviewing another book for this journal, the reviewer inadvertently made reference to the First rather than the Second Edition of Blakiston's New Gould Dictionary. Dr. Hilty has graciously agreed to review the latest edition.

Blakiston's New Gould Medical Dictionary. Second edition. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, New York, 1956. 1463 pp., 252 illus. on 45 plates, 129 in color. $11.50.

The making of dictionaries no doubt involves drudgery as Sam Johnson implied; nevertheless the effort will go on and new tomes come forth. The latest *Blakiston's New Gould Medical Dictionary* ranks high in this austere tradition; its meticulous lexicography eminently justifies the undertaking. This dictionary has 1344 pages of definitions and 117 pages of appended tables, as against 1156 and 136 respectively in the 1953 edition.

The 1956 edition omits the diet tables and veterinary doses, material readily available elsewhere. It adds several new items to the table of elements and amplifies the table of enzymes somewhat. It also inserts three new sections—a table of thermometric equivalents, a table of characterized vitamins, and a table of radioactive and other isotopes commonly used in medicine.

The 1956 edition also reprints conveniently in the middle of the book the forty-five excellent plates presented in the 1953 edition.

Compilers of medical dictionaries are faced on the one hand with a constantly increasing plethora of material and on the other with the hard economic facts of survival. The editors of this latest revision of *Blakiston's New Gould Medical Dictionary,* a fine sturdy volume, are to be congratulated upon their skill and judgment in presenting up-to-date definitions and helpful information and at the same time keeping the price down, both attractive features.

Palmer A. Hilty
State College of Washington

The Chemical Formulary, Harry Bennet. Tenth Edition. Chemical Publishing Co. Inc., New York, New York. xii + 392 pp. $7.50.

This new volume of the *Chemical Formulary* series is a collection of new formulae. The only repetitious material is the introduction which is used in every volume for the benefit of those who may have acquired only the present volume and who have little educational background or experience in chemical assembly. Conversion tables of weights and measures facilitate easy calculation.

The pharmaceutical profession may be especially interested in the third, fourth, fifth, and eighth chapters. These will be treated quite fully for reader value.

The third chapter is concerned with a wide range of formulations of drugs and cosmetics, covering anti-tanning, deodorant, antiperspirant, vanishing, cleansing, vitamin, and hand protective products. The hand cleaning and industrial barrier creams enjoy particular interest because of their recent acceptance. Nail enamel, cake make-up, powder stick, lipstick, cold hair-wave and hair dyeing formulations are valuable if for no other reason than to follow the market trends. A variety of aromatic fixatives is included for the perfumer's art. No formula for a lather shaving product of either the bar, cream or aerosol type is found. In the drug section are included diaper products, antiseptic and astringent lotions, and antihistamine creams and lotions of the cosmetic type. Other formulae include, ear-wax softeners, nose drops, cough syrps, anti-midge, acridine and prophylactic creams, mydriatic and miotic ointments and parenteral nutrients.

The fourth, fifth, and eighth chapters list formulae for the orchardist and husbandman. Farm and garden specialties include remedial agents for pink-eye; coccidiosis; iron deficiency diseases of trees, vegetables and flowers; insecticides; fungicides; and herbicides. Lindane, DDT, dilan, aldrin, dieldrin, chlordane, toxaphene, parathion, melathon, methoxychlor, pyrethrin, dimethyl phthalate, phenyl mercuric acetate and potassium cyanate, and FeEDTA are specifics employed in these formulations.

The sixth chapter is especially helpful to the baker, chef, restauranteur, and fountain manager.

The seventh chapter formulas are assigned to inks and marking compounds applicable to synthetic polymers, co-polymers, ball-point pens, etc.

Tanning agents, leather finishes and traction dressings are found in the ninth chapter.

The tenth chapter which is devoted to lubricants and oils is thorough in that it embraces everything in the range from penetrating oils, through the mold, stick, solid, drawing, and core lubricants. Five pages are devoted to hydraulic-brake fluids, and solvent and coupling agents for fluid transmissions.

Materials of construction of chapter eleven includes formulas for acoustical plaster, masonry waterproofing, wood preservation, dielectric thermoconductors, and transparent surface electrical conductors.

The next chapter is restricted to metallurgical products. Some druggists would be interested in the rust removers and inhibitors, anti-freeze solutions, and fluxes.

The thirteenth chapter offers the newer innovations of the paint, varnish and lacquer trades. Single and multiple coat, fume and chemical resistant paints and primers occupy the reader's interest.

Chapter fourteen embraces offers for bacterial and fungal controls for paper products. Coatings and sizes are included.

The newer silicone polishes for metals, plastics, painted and enameled surfaces useful to the skilled tradesman are treated in the sixteenth chapter.

The seventeenth chapter is devoted to explosives and pyrotechnics.

Formulations of elastomers, plastics, resins, and waxes interest footwear manufacturers and suppliers of dressings in chapter eighteen.

The final chapters are devoted to specialty soaps, detergents and solvents for wet, dry, and general cleaning, back sizing, waterproofing, flameproofing, and tarnish proofing fabrics.

Pharmacists and chemists with years of experience often have to spend considerable time in acquainting themselves with newer products. Many publications, laboratories, manufacturing firms and individuals have been consulted in order to compile the best information found in this revision. Many of the formulae included are used commercially, many have been taken from literature and some may be subject to errors and omissions. A formula does not often give the exact results expected by the compounder, but this may be the fault of the choice of product for the result desired.

Thirty-five pages have been devoted to trade-mark chemicals, supplies and where to buy them. For busy buyers and expeditors these compilations are worth many times the cost of the book. No wholesale druggist with a desire to supply the retailer with what he wants can afford to be without a copy. It should also be found on the reference shelf of every trade, high, and preparatory school library. Pharmacists with a devotion to service to their community should have one also.

Gordon A. Bergy
West Virginia University

An institution, like a business, is not built by the men that leave it. It is built by the men that stay by it.

Rufus A. Lyman, Am. J. Pharm. Ed., 2, 385 (1938)

NEW BOOKS

Methods of Biochemical Analysis, Vol. V, David Glick. Interscience Publishers, New York 1, New York, 1957. ix + 502 pp., tbls. $9.50.

World Directory of Medical Schools, World Health Organization. First Edition. Geneva, Switzerland, 1957. 314 pp. $5.00 (paper).

The Chronically Ill, Joseph Fox. Philosophical Library, Inc., New York 16, New York, 1957. xix + 229 pp. $3.95.

Organic Syntheses, Vol. 37, James Cason. John Wiley & Sons, Inc., New York 16, New York, 1957. vii + 109 pp., 2 figs. $4.00.

Manual of Nutrition, Philosophical Library, New York, New York, 1957. 70 pp., 2 figs. $3.50.

Methods in Enzymology, Vol. IV, Sidney P. Colowick and Nathan O. Kaplan. Academic Press, Inc., New York 3, New York, 1957. xii + 979 pp., figs., illus. $24.00.

Quantitative Organic Analysis, James S. Fritz and George S. Hammond. John Wiley & Sons, Inc., New York 16, New York, 1957. ix + 303 pp., 47 figs. $6.50.

Modern Science and Modern Man, James B. Conant. Columbia University Press, New York 27, New York, 1957. 111 pp. $2.25.

Introduction to Protein Chemistry, Sidney W. Fox and Joseph F. Foster. John Wiley & Sons, Inc., New York 16, New York, 1957. viii + 459 pp., figs. $9.50.

The Appraisal of Applicants to Medical Schools, Helen Hofer Gee and John T. Cowles. Association of American Medical Colleges, Evanston, Illinois, 1957. xix + 228 pp., tbls., 10 figs. $3.00 (cloth), $2.00 (paper), quantity discounts.

Food Poisoning, G. M. Dack. The University of Chicago Press, Chicago 37, Illinois, 1956. xi + 251 pp., 13 tbls. $6.00.

The Path of Carbon in Photosynthesis, Melvin Calvin and J. A. Bassham. Prentice-Hall, Inc., New York 11, New York, 1957. x + 104 pp., figs., 5 tbls. $3.00.

Steps for Today Toward Better Mental Health, National Health Council, New York 19, New York, 1957. x + 117 pp. Free (paper).

The Lynn Index, A Bibliography of Phytochemistry, Monograph I, Massachusetts College of Pharmacy, Boston, Massachusetts, 1957. 46 pp. $1.00 (paper).

Prescription Writing and Medical Jurisprudence, Harold N. Wright. Burgess Publishing Company, Minneapolis 15, Minnesota, 1956. iii + 118 pp. $2.75.

A Handbook of Animal Physiology, E. M. Pantelouris. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. 255 pp., 58 figs., tbls. $6.25.

Veterinary Toxicology, R. J. Garner. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. 415 pp. $7.50.

Textbook of Pharmacognosy, George Edward Trease. Seventh Edition. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. viii + 808 pp., 256 figs., tbls. $8.50.

Inorganic Synthesis, Volume V, Therald Moeller. McGraw-Hill Book Company, Inc., New York, New York, 1957. xiv + 265 pp., 19 figs., tbls. $6.00.

The Life, Work and Times of Charles Turner Thackrah, Surgeon and Apothecary of Leeds, A. Meiklejohn. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. viii + 238 pp. $6.00.

Biochemistry and Human Metabolism, Burnham S. Walker, William C. Boyd, and Isaac Asimov. Third Edition. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. vii + 937 pp., figs., tbls. $12.00.

Handbook of Solvents, Volume 1, Ibert Mellan. Reinhold Publishing Corp., New York 22, New York, 1957. v + 249 pp., 6 figs. $6.50.

Source Book of Industrial Solvents, Volume 2, Ibert Mellan, Reinhold Publishing Corp., New York 22, New York, 1957. iv + 267 pp., 61 tbls., 18 figs. $7.00.

Catalysis in Practice, C. H. Collier. Reinhold Publishing Corp., New York 22, New York, 1957. v + 153 pp., figs., tbls. $3.95.

Aids to Materia Medica and Therapeutics, J. W. Hadgraft. Fifth Edition. The Williams & Wilkins Company, Baltimore 2, Maryland, 1957. vii + 259 pp., tbls. $3.25.

Manual of Pharmaceutical Law, William Pettit. Second Edition. The Macmillan Company, New York 11, New York, 1957. ix + 303 pp. $4.50.

Drugs and the Mind, Robert S. de Ropp. St. Martin's Press, Inc., New York 17, New York, 1957. x + 310 pp. $4.50.

Advances in Enzymology, Volume 19, F. F. Nord. Interscience Publishers, Inc., New York 1, New York, 1957. 457 pp, tbls. $9.85.

Atomic Energy in Medicine, K. E. Halnan. Philosophical Library, New York, New York, 1957. ix + 157 pp., 31 figs., 11 tbls. $6.00 .

Volumetric Analysis, Volume III, Titration Methods: Oxidation-Reduction Reactions, I. M. Kolthoff, R. Belcher, V. A. Stenger, G. Matsuyama. Interscience Publishers, Inc., New York 1, New York, 1957. ix + 714 pp., figs., tbls. $15.00.

Aids to Botany, H. J. Bonham, E. J. B. Bish, and J. M. Thompson. Fourth Edition. The Williams & Wilkins Co., Baltimore 2, Maryland, 1957. viii + 226 pp., 57 figs. $2.75.

Technical Report Writing, James W. Souther. John Wiley & Sons, Inc., New York 16, New York, 1957. xi + 70 pp., 24 figs., 3 tbls. $2.95 (paper).

Encyclopedia of Chemical Technology, First Supplement Volume, Raymond E. Kirk, Donald F. Othmer, Anthony Standen. Interscience Publishers, Inc., New York 1, New York, 1957. xviii + 974 pp., figs., tbls. $25.00.

Cortisone Therapy, J. H. Glyn. Philosophical Library, Inc., New York 16, New York, 1957. x + 162 pp., 4 figs., tbls. $10.00.

Introduction to Enzymology, Alan H. Mehler. Academic Press Inc., New York 3, New York, 1957. viii + 425 pp., 38 figs., 7 tbls. $10.80.

The Relation of Psychiatry to Pharmacology, Abraham Wikler. The Williams & Wilkins Co., Baltimore 2, Maryland, 1957. viii + 322 pp. $4.00 (paper).

The Prescription Pharmacist Today, Wallace Croatman and Paul B. Sheatsley. Health Information Foundation, Research Series, New York 17, New York, 1957. 27 pp. Free (paper).

Graduate Student Enrollment and Support in American Universities and Colleges, 1954, National Science Foundation. Government Printing Office, Washington 25, D.C., 1957. Catalog No. NS 1.2:G 75. 302 pp. $1.50 (paper).

A Survey of State Pharmacy Laws (Relating to the Sale by General Merchants of Non-Prescription Drugs, Variously Designated as "Patent or Proprietory Medicines," "Domestic Remedies," "Home Remedies," "Household Remedies," and Similar Terms), John M. Seus. The American Pharmaceutical Association, Washington 7, D.C. vi + 112 pp. $3.00 (paper).

NEW FILM

Vascular Headache. 16 mm. sound color film, 15 minutes. A professor of medicine discusses the causes, mechanisms, and treatment of vascular headaches. Available on loan free from Medical Film Division, Organon Inc., Orange, New Jersey.

In the field of pharmacy there is no place for the pessimist. If a man is not an optimist it means he does not know what is going on.

Rufus A. Lyman, Am. J. Pharm. Ed., 3, 577 (1939)

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